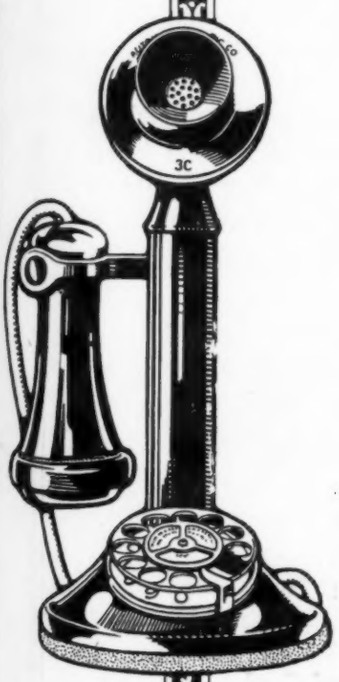
TELEPHONE ENGINEER

VOLUME 28 MARCH, 1924 Number 3



Modern Equipment for the Small Exchange

CONTINUOUS uniform service; quick, accurate connections; economical operation—in fact, every feature found in large city automatic exchanges—all of these are offered by Strowger Automatic small exchange equipment.

There is this additional advantage, too. The traffic and service conditions in small towns and rural communities are simpler than they are in large cities. The equipment is therefore simpler in design, with much lower initial cost per line and greater economy in maintenance.

In Strowger Automatic equipment for small exchanges all features not necessary for the traffic and service needs of the large city have been eliminated. Everything essential to modern, high grade service has been retained.

The Strowger Automatic small exchange system can be furnished in the very small or "Community Automatic Exchange" type of plant, or for larger exchanges up to thousands of lines. The elimination of all unessential features naturally results in a low cost, placing this equipment within the financial reach of every small company.

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INTERNATIONAL TELEPHONE SALES AND ENGINEERING CORPORATION . . . . . *New York*

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FOR YOUR RADIO SET

Burns LOUD SPEAKER

No. 105
Speaker Complete

For use with phonograph or Complete with Loud Speaker Horn

Operate on any receiving set having one or more steps of amplification

The Burns Loud Speaker has been designed for broadcast reception. Music and voice are reproduced in their true tone without distortion or harshness and free from disturbing resonance. No experience is required to operate the Burns Loud Speaker. Simply attach in same manner as the head phones. No battery is required. Convenient tone regulator on the back of case permits easy adjustment of tone and volume.

Complete Speaker

No. 105 set consists of a flare horn of proper proportions and neat size mounted on base which holds the speaker unit in position for easy adjustment. The horn is non-vibrating material producing a purity and mellowness of tone impossible to secure from horns of other materials. The voice with all its fine shadings, the various musical instruments with their wide range of pitch will be reproduced with trueness and volume.

Speaker Unit

Note Convenient
Tone Adjuster

The No. 100 Burns Unit can be attached to any phonograph having a tone arm of same dimensions as the Victrola and is easily adapted to other makes. The excellent acoustic qualities of the sound chamber of the phonograph are utilized. This combination make a very neat arrangement for home use.

No. 100
Loud Speaker Unit

No. 100 Burns Speaker Unit, with Victrola attachment and Cord $10.00
No. 105 Burns Speaker, complete with horn and base 20.00

Manufacturers of high grade telephones for over 30 years
Full line of switchboards, terminals, and instruments

American Electric Company

State and 64th Streets **Chicago, U. S. A.**

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GIVE TOLL INFORMATION IN THE DIRECTORY

A short time ago we received a telephone directory from a progressive telephone company that had several features which attracted our attention. This company operates in two small cities, and the directory for the two cities is combined. Upon turning the front cover page, we found the list of subscribers for one city on page one of the directory. The usual "instructions to subscribers" did not appear. Following through to the end of the list for this city we found a four-page colored paper insert, and then the list for the second city.

It was to the colored paper insert that our attraction was particularly directed. On page one was a brief statement of the service connection charges in force. Pages two and three were devoted to toll service, and page four to a few brief and pointed suggestions for use of the telephone. On the pages devoted to toll service was given complete information regarding the different classes of toll calls, and the relative rates for each class.

A little talk with subscribers will show that relatively few know that there are other classes of toll service than the person-to-person call. A search through the telephone directory, where the subscriber would naturally go for information usually reveals the following statement, "Call long distance operator for information regarding toll service." The idea of including information regarding the toll service in an attractive colored insert certainly should prove to be a business accelerator.

CO-OPERATION IN SERVICE DIFFICULTIES

The Massachusetts Public Utilities Commission is setting a precedent in the way of co-operation with utilities under its supervision that might well be followed by other utilities commissions. Following the recent telephone strike in Boston, service naturally suffered and the Commission received many complaints from subscribers. Instead of issuing a formal order to the telephone company to improve service and threatening penalties, the commission began a series of tests of service under the direction of the chief of the telephone and telegraph division, William H. O'Brien. After the tests were made and analyzed, Mr. O'Brien and the officials of the telephone company in conference, worked out methods of eliminating the greater part of the difficulties. This spirit of helpful co-operation between the regulatory body and the telephone company has already resulted in a marked improvement in telephone service in Boston; results which will surely be achieved wherever it is tried.

"It ain't the poles, nor instruments,
Nor rates the public pay,
But the close co-operation
That makes us win the day.
It ain't the individual, nor the
Company as a whole,
But the everlastin' teamwork
Of every bloomin' soul."

PUBLICITY FOR THE CONSTRUCTION PROGRAM

Busy with the many details of planning and organizing the spring construction work, the average manager is very likely to overlook one feature of his construction program that has an effect in building up that intangible part of the property known as good public relations. He is often so engaged in the work that is to be done on the plant that he overlooks the opportunity for publicity that it affords.

All construction and improvement work in a telephone plant has a legitimate news value. The local newspapers recognize this and are willing to give space to news stories describing these improvements. The newspaper, however, is frequently not informed that they are being made or, if it is informed, does not have the opportunity of knowing the extent of the work nor its probable effect on the property and the service.

If this type of valuable publicity is to be secured it is necessary for the telephone management to furnish the data for the story to the local editor. A brief statement of the facts written out and sent to him will provide him with the basis for the news story. If it is possible to write the story in news form that can be printed with little editing so much the better, but there are few telephone men who can prepare a story in this form. For the greater number, the best way is to furnish the facts and let the newspaper writer prepare the story.

The publicity for the construction program should not be limited to that which may be secured through the news columns of the

local paper. A great many companies are finding it to be of advantage to use paid advertising in the local papers. This kind of publicity could be used to place before the public some of the features of present day construction methods and costs that can not be presented in a news story.

Comparisons can be made between the amount of trouble in open wire plants and modern cable systems. The effect of adopting the better type of construction upon the cost as well as the quality of service can be shown, always emphasizing the fact that better service costs more and that even with the increased cost of service, the cost has not yet reached anywhere near the value of the service. These are only a few of the things that can be placed before the public in paid advertising.

No company can afford to overlook the opportunity for publicity that is offered where it is undertaking any new work.

A well planned campaign of publicity carried along at the same time as the program of construction and replacement will provide the telephone company, not only with a better plant, but also with better public relations.

THE PLACE OF THE COMMITTEE IN ASSOCIATION WORK

In following out the plans for general staff activities of the United States Independent Telephone Association, and in its cooperation with the work of the American Engineering Standards Committee in promoting standardization in the telephone industry, much will have to be done by small special committees selected for their fitness for the particular task, if the work is to progress. No one man or small group of men can perform all of the work that will be required.

As has been pointed out before, while the work will ultimately require a staff of full time workers in the general office, this can not come at once and even when it does come the staff cannot function without the assistance of committees from the operating companies.

In making plans for the organization activities, the officials of the Association would do well to study the operation of similar bodies in other utility fields. The problem in the Independent Telephone field is not greatly different than that of the National Electric Light Association and the American Electric Railway Association. Each of these associations is made up of a large number of operating companies having no direct connection with the others of the group.

A little study of these associations will show what can be done in the way of collecting and disseminating through organization engineering, accounting, financial and other information. Much of the work of these associations is done through standing and special committees. Appointments upon these committees are looked upon not as honors but as opportunities for service to the industry. The committees in other associations work and produce results as may be testified from personal experience.

When men in the telephone industry are asked to serve on such committees, as they certainly must be if progress is to be made, they must accept the service in the same spirit. Committee work of this kind will be a new experience to many engineers, plant men, accountants, traffic men and others in the Independent telephone field. It will be an added burden upon men who find their time already well filled but we are sure they will be glad to put forth the additional effort with the feeling that what they are doing is for the welfare of the entire industry.

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AN UNJUST RATE LAW

In reading the report of the proceedings of the annual convention of the state telephone association of South Dakota, we learned, for the first time, that the compensation to telephone companies in that state for switching service stations is fixed by statute. Apparently the telephone companies of that state were the victims of some of the same kind of political log-rolling that twenty years ago fixed a two-cent per mile rate for railway passenger service in many states.

This type of rate-making is unfair, not only to telephone companies but to regular telephone subscribers. If service stations do not pay their fair share of the cost, the deficiency must be collected from others, which is obviously discriminatory. The South Dakota Association is to be commended for its stand for the repeal of the present law and the substitution of a rational method of determining the charges for switching station service.

HIGHER RATES FOR METALLIC SERVICE

Several months ago, the Vermont Public Service Commission ordered a telephone company to convert all of its lines to metallic circuits on account of complaints of poor service due among other things to the proximity of power lines. The commission now modi-

fies its order excusing the company from further construction of metallic lines as the service is fairly satisfactory as a result of work done.

The commission found that the cost of reconstruction at present prices for materials and labor was so great that rates would have to be higher to pay a return on the investment. It would seem that the commission should have foreseen this and should not have issued such a drastic order in the first place, thus avoiding the necessity of reversing itself.

This paper has been a consistent advocate of improvement of the telephone plants of the country and has pointed out that one of the desirable improvements is the gradual conversion of grounded lines to metallic lines. It does not believe, however, that such changes should be required by commission order without regard to the ability of the company to raise money to do the work or of the willingness of subscribers to pay the additional cost of service.

Under the present system of regulation, there is little incentive for the manager of the small plant to eliminate his grounded circuits. In effect, he is told that he may go ahead and spend the money; then, if he finds that the rates do not bring an adequate return on the additional investment, he may come before the commission and apply for an increase. Can he be criticized if he gets along with the present plant and the present rates rather than go to the trouble of raising additional funds and after the change is made find himself faced with the difficulties of another rate adjustment?

If public service commissions are interested in improving telephone service they could do much to encourage the improvement by providing an incentive. In the matter of grounded lines, they could permit a higher rate for metallic line service than for grounded line service and allow the telephone company to place the higher rates in effect as fast as its lines were converted. Thus a subscriber on a grounded line would be charged the lower rate until such time as his line was made metallic and then his rate would automatically be raised. This plan has worked in the conversion from local battery to common battery. Why will it not work in the conversion of grounded lines to metallic?

THE BELL'S ANNUAL REPORT

The Annual Report of the Directors to the Stockholders of the American Telephone and Telegraph Co. always is an interesting document. It furnishes a survey of the results of operation of more than two-thirds of the telephone business of the country for the past year. It usually is a record of progress in the financial, legal, accounting and technical divisions of the industry. In it usually will will be found statements of the policy of the company in matters of major importance, and forecasts of its business and policies for the future.

The 1923 report, like its predecessors, is an interesting statement of the operations of the company, particularly from the financial side, but one accustomed to the reports in past years will miss some of the other features. No doubt, the directors have felt that the large number of new stockholders should be given a greater amount of information regarding the system's organization and, therefore, found it necessary to reduce the space devoted to matters that have been included in past years. It is to be hoped that this will not be a permanent change. In spite of the omission of some important matters such as machine switching, and the bare mention of others, the report still is one of the most complete of any that is issued by a corporation to its stockholders, and it is well worth the study of every man interested in the telephone business.

Accident Prevention

Some Statistics Compiled from the Southern Group of Bell Companies

What are the chances that a "lost time" accident will occur among plant men? Some light may be thrown upon this question by some recent figures presented by E. L. Helvin, Supervisor of Safety of the Southern Group of Bell telephone companies, in "Southern Telephone News." The figures for these companies arranged by divisions are given in the following table:

Comparative Standing of Divisions for 12 Months' Period Ending December 31, 1923, Based on the Number of Lost Time Accidents Per 100 Male Plant Employes.

Division	Average No. of Employes 12 Months	Number of Lost Time Accidents	Lost Time Accidents Per 100 Male Plant Employes
Florida	291	8	2.75
Georgia	808	24	2.97
Carolinas	571	20	3.50
Tennessee	673	28	4.16
Alabama	433	19	4.39
Kentucky	391	20	5.12
Mississippi	332	21	6.32
Louisiana	638	46	7.21
Average for Southern Bell Telephone and Telegraph Company			3.38
Average for Cumberland Telephone & Telegraph Company, Inc.			5.65
Average for Both Companies			4.50

These figures indicate that there were 4.5 lost-time accidents per 100 plant employes during 1923. Based on these figures, a small company having a plant force of 10 men might expect a lost-time accident every second year, if its men were as well trained and as well protected against accidents as the men of the Southern companies. Motor vehicle accidents constituted a considerable portion of the total number of accidents, there being 236 in 1923, a reduction of 22.4 per cent from the number in 1922.

The accidents for December were classified as follows:

Poles breaking off	2
Falling from pole	1
Breaking of safety belt	1
Falling from messenger	1
Breaking of ladder	1
Cranking automobile (back fire)	1
Employes injured by public owned and driven automobile	1
Spurs cutting out	1
Hands or feet cut by spurs	2
Objects striking, crushing or jamming	6
Particles entering eye	1
Sharp or pointed objects	5
Handling tools	5
Falling tools	1
Strains and sprains	7
Glass	1
Nails	2
Wire ends	1
Unclassified	1

It is evident from this list that a majority of accidents could be classed as preventable and that there is still a considerable chance for improvement. This is probably true with every company. If all preventable accidents could be eliminated it is certain that the lost-time accidents would be reduced to a still smaller number and the risk of accident to plant men would be practically negligible.

McCanne Stromberg Chief

Ray Manson and E. A. Hanover, New Directors

Rochester, N. Y.—W. Roy McCanne was elected president of the Stromberg-Carlson Telephone Mfg. Co. at its annual meeting here, filling the position made vacant when George W. Todd became chairman of the board, with more time to devote to his other interests.

One of the star years in the S-C annals was recorded by the report presented to the stockholders. Volume of business and net profit for 1923 were approximately 20 per cent greater than in 1922.

Mr. McCanne has been identified with the Stromberg-Carlson Telephone Manufacturing Company, and its predecessor, since 1906. He came to Rochester from St. Louis, where he had much experience in telephone affairs. In 1914 he was largely responsible for the reorganization of the Stromberg-Carlson Telephone Manufacturing Co. and became the treasurer and general manager of the new corporation. The flourishing financial condition of the company, the contentment of its workers, attest to the executive ability, tact and judgment of Mr. McCanne.

In his new capacity Mr. McCanne will act as president and general manager. Since coming to Rochester in 1906, Mr. McCanne spent a year and one-half in the employ of the Eastman Kodak Company. This was prior to the reorganization of the telephone company.

Two New Directors

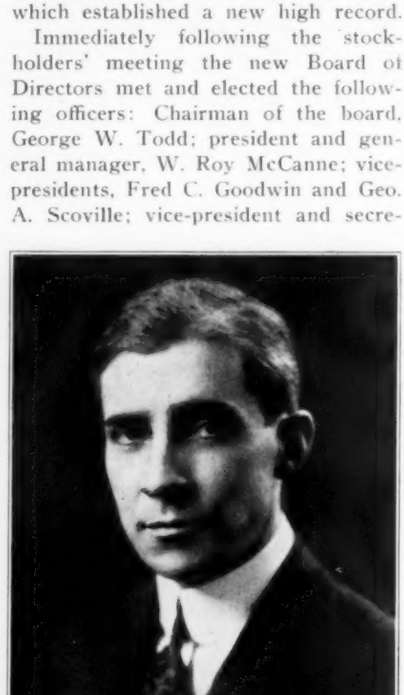
The two new members of the directorate to complete the personnel of nine, authorized by the stockholders, will be Ray H. Manson and Edward A. Hanover. Mr. Manson has for the past eight years been chief engineer of the company. Mr. Hanover has been its purchasing agent for about seventeen years and has been with the company about twenty-three years. Both men are to be elected to the board in recognition of their ability and their faithful and valuable services to the company.

The directors who were re-elected are: George W. Todd, W. Roy McCanne, J. Foster Warner, Thomas E. Lannin, Fred C. Goodwin, Wesley M. Angle and George A. Scoville.

Telephone business made up about 90 per cent of the total volume of the company last year. Of its total business about 30 per cent was transacted with utilities in foreign countries, and the balance with telephone companies in the United States. Of this domestic telephone business about 20 per cent was transacted with Bell companies, and the balance, about 80 per cent, was done with Independent or non-Bell companies.

The company's prospects for continued prosperity are considerably brighter than they were a year ago, and the officers believe that during the ensuing year the volume of business will be further increased over 1923, which established a new high record.

Immediately following the stockholders' meeting the new Board of Directors met and elected the following officers: Chairman of the board, George W. Todd; president and general manager, W. Roy McCanne; vice-presidents, Fred C. Goodwin and Geo. A. Scoville; vice-president and secretary, Wesley M. Angle; treasurer, George V. Lennon; assistant secretary and assistant treasurer, Edwin C. Roworth; auditor, Wilbur W. Hetzel.



W. Roy McCanne

Personnel Changes

Mr. Goodwin, the first vice-president, is a member of the law firm of Hubbell, Taylor, Goodwin & Moser, counsel for the Stromberg-Carlson Telephone Manufacturing Company, and other important interests. Mr. Scoville, who becomes vice-president, has been the sales manager of the company for the past eight years. Mr. Angle has been with the present company and its predecessor, the old Stromberg Company, for about twenty years, and is regarded as an exceedingly capable executive. Mr. Lennon, who became treasurer, being promoted from the position of assistant treasurer, has been with the company as auditor and assistant treasurer for about twenty years.

Mr. Roworth, who now becomes assistant secretary and assistant treasurer, has been the assistant secretary and credit manager of the company for several years and has been connected with the organization for nearly eighteen years. Mr. Hetzel, who succeeds Mr. Lennon as auditor, has been office manager and assistant to Mr. Lennon for several years.

Harry Eldridge Now Illinois Suburban Commercial Head

Chicago, Ill.—Harry E. Eldridge has been made commercial superintendent of the suburban division of the Illinois Bell Telephone Co. He has supervision of 105 towns within a radius of 50 miles from Chicago. Mr. Eldrige went with the Chicago Bell October 1, 1907 as service inspector in the suburban traffic department and has kept climbing persistently ever since.

Otto W. Ficklin Made S. W. General Plant Superintendent

St. Louis, Mo.—Otto W. Ficklin has been appointed general plant superintendent for the Southwestern Bell Telephone Co. He assumed his new position March 1. He has been with the Bell for many years, having served as plant superintendent in Texas prior to his latest advancement.

Oscar W. Johnson, formerly wire chief at Rapid City, Deadwood and Lead, South Dakota, has returned to the Chadron district as district manager for the Northwestern Bell Telephone Company, with headquarters at Chadron, Neb., after several years of service in other parts of the company's territory.

L. L. Thomas, manager of the Illinois Bell Telephone Co. at Sterling, Ill., has been transferred to Moline, where he will have charge of the Moline and East Moline exchanges.

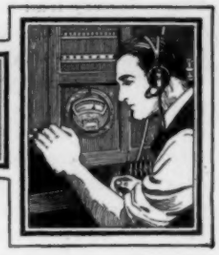
E. C. Dorum, manager of the Northwestern Bell Telephone Co. at Carroll, Ia., has resigned his position and has been transferred back to his home city of Sioux City. Clyde Farrell took charge as manager at Carroll, February 1.

Elkton, S. D.—Chris Anderson, formerly of Marion, S. Dak., has bought the local telephone property from C. C. Fick.

Wilton, Ia.—I. H. Armstrong, formerly of Agency, Ia., has purchased the Wilton Telephone exchange from W. L. Agee.

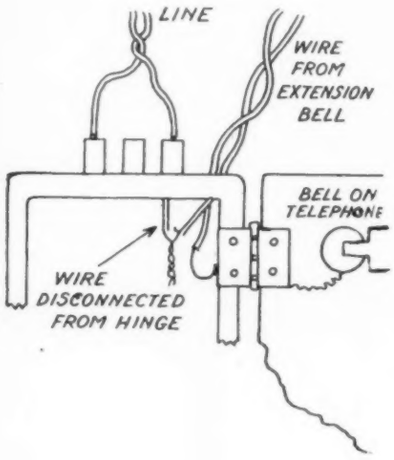
Pittsfield,Ill. — Pike County Telephone Co., Ed. D. Glandon, will rebuild farm and toll lines this summer and will need some poles and wire.

LINE AND DESK



AN OLD STUNT THAT SAVED A TELEPHONE

Every once in a while a man will find that something that he thought was an old "stunt" is new to somebody else. I had an example of this a short time ago when I found a man planning to change a series telephone to a new bridging telephone on a single line because he figured that an extension bell could not be cut into a series line. The series telephone was in good shape tor use but it would be a second hand instrument if used on a new installation so the best plan was to leave



it in service. In order to use it, we fixed up a series extension bell and run twisted pair from the bell to the telephone. The twisted pair was run through a hole in the magneto box and one of the leads to the bell in the telephone was disconnected at the hinge of the door. One wire to the extension bell was connected to the hinge and the other to the wire that was taken off from the hinge. In this way the extension bell was connected in the ringing circuit but was cut out of the talking circuit when the hook was up. By doing this we will get several years' more service out of a telephone that we probably could not use if it was taken out and a new one put in.

I am passing this along for the benefit of any one else that may have to do the same thing.—Contributed by C. Galloway.

TESTMAN CAN BUILD GOOD-WILL BY WIRE

The question of "Public Relations" is a real problem with the various plant employes. Therefore, we should strive at all times to do our best to give the public the most favorable impression of our company possible.

The installer, lineman and repairman are constantly meeting the public face to face, but it is different with the testman, as he meets them over the telephone only.

It often is said: "People will never say to your face what they will say over the wire." This I find quite true, but regardless of what is said, it is up to the testman to please and impress upon the public that our company is endeavoring to give the best of service.

After a bad storm, when trouble is such that some telephones remain out of order for several days, the jolly, good natured and ever smiling testman has a great opportunity to make good with the public. Sometimes an irate subscriber may call in for about the third time and, in a "dark brown" voice, inform the repair clerk that he is tired of reporting his telephone to her, and would like to talk to "someone with brains." The repair clerk, while she doesn't appreciate the remark, courteously explains the number of cases of trouble that the storm has caused and that our company is doing everything possible to restore service. But the testman may have to take the case in hand. While he is listening to the subscriber's story, he is at the same time thinking how best to care for the trouble at the earliest moment and to gain a friend for the company. An explanation of the actual conditions the storm has caused and the necessary effort that is being put forth to re-establish his service help him. The testman must be sympathetic and a diplomat, must make good his promises—and always be courteous. Then he will gain friends for the company and boosters for its service.—Wm. D. Brookmeyer, in "The Mouthpiece."

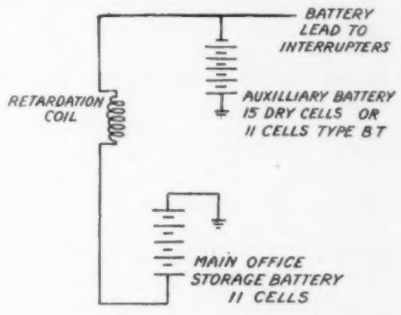
We will send you our check for any suggestion you may contribute that is found available for this department. Address: TELEPHONE ENGINEER, ***28 E. Jackson Blvd., Chicago.***

PROPER USE OF "NOISE-KILLER" BATTERY

In answering a question relative to use of 1200 pair cable in the February number, reference was made to the use of "noise killer" battery in connection with harmonic ringing converters. One of our subscribers, now writes as follows:

"We have a Dean Electric Co. harmonic ringing machine 33-50-66 and 16 cycles—and use a "noise killer" battery. Would thank you to advise how our circuits should be arranged in order to eliminate noises on our lines in the cable."

In answering the question to which reference is made, it was said that noise


BATTERY LEAD TO INTERRUPTERS
RETARDATION COIL
AUXILLIARY BATTERY 15 DRY CELLS OR 11 CELLS TYPE BT
MAIN OFFICE STORAGE BATTERY 11 CELLS

created in the storage battery by the operation of the harmonic converter, due to improper maintenance of the "noise killer" circuit was frequently charged to the cable. It was not to be understood by this that noise actually present due to cable conditions could be remedied by the use of the "noise killer" circuit.

The operation of the harmonic converter from the main office battery without special means for suppressing the abrupt changes in current due to the making and breaking of the contacts of the vibrators will cause noise in the telephone circuits. The portion of the circuit arranged for reducing this noise, is shown in the accompanying figure. A retardation coil is provided to smooth out the sharp changes in current that occur when the interrupters make and break. If this retard coil is sufficiently large it will offer too much impedance to the change of current to permit of satisfactory operation of the ringers.

A small auxiliary battery is connected

to the battery lead between the coil and the interrupters. The action of this battery is somewhat as follows: When current is drawn from the main battery at the time the interrupter contact is made, the voltage across the contacts will decrease due to the impedance of the coil. When this happens current will flow from the auxiliary battery momentarily. The current from the main battery will build up somewhat slowly due to the choking action of the coil and this slow building up does not create the noise in the main battery to such an extent as if the current increased at once to its maximum value.

The auxiliary battery is frequently made up of 15 dry cells when the main battery has 11 storage cells. The objection to the dry cell battery is that it frequently becomes exhausted and is not replaced promptly, thus losing the noise killing effect. A preferable scheme is to use a small storage battery. Eleven cells of the Electric Storage Battery Co.'s type BT make a very satisfactory battery. No special charging means need to be provided as the battery is floating directly across the main battery at all times and will be maintained at full voltage.

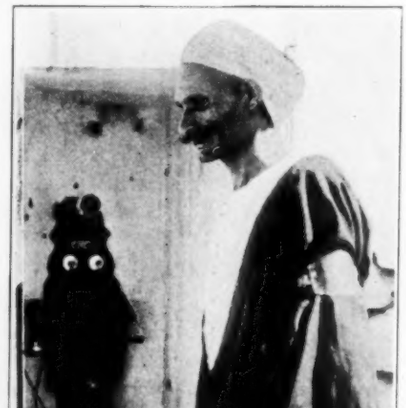
In answer to the question it is suggested that an inspection of the harmonic converter circuit be made and the condition of the auxiliary battery and its connections be checked up. If everything is as it should be and the noise persists on cable lines but not on lines connected directly to the switchboards (as for example telephones located in the office) it is probably due to low insulation in the cable and tests of the cable will have to be made to locate the trouble.—Staff Contribution.

SHOCK ABSORBER FOR TELEPHONE CABLES

A unique method of supporting cables on a railway bridge is described by W. P. Wright in a recent number of "Long Lines." It was necessary to cross the Susquehanna River with the Philadelphia-Washington toll cable at a point where the stream is almost a mile wide, near Havre de Grace, Md. The cable was to be supported on a railroad bridge which was subject to severe vibration when trains passed. A small cable that had been installed previously had been in trouble a number of times, due to cutting of the sheath at the suspension rings. Marlin hangers were considered but it was felt that they would not entirely solve the problem. Finally a shock-absorbing arrangement was worked out. Additional strands were provided from the point of attachment on the bridge to the cable messenger. This is better shown in the accompanying illustration than by any description. The effect of the extra strands is to take up the shock, much as the springs on an automobile relieve the shock when the wheels pass over rough roads. In this way, the cable is not subjected to severe vibration and no trouble has been experienced in the several years that it has been in service.

TUT'S P. B. X.

Here is the exotic looking gent who handles the telephone calls at the tomb

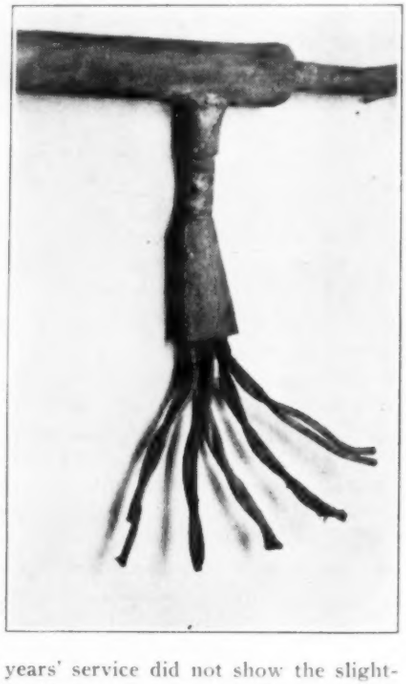


of the late lamented Tut-Ankh-Amen, of whom you possibly have heard. With Howard Carter's busy band of excavators on the job, the telephone is kept active. It is proving a priceless boon to the newspaper correspondents who can sit in some cool and distant cafe and get, via telephone, the latest dope on the treasures brought to light. The natives, so the picture man tells us, are in awe of the mysterious instrument that talks, regarding it somewhat in the same light as a few widely quoted scientists regarded the evil spirits released by the exploration of the sarcophagus.

A FREAK CABLE SPLICE

I am sending you a photograph of what I consider a freak splice as it has five No. 17 twisted pair wires connected in a lead sleeve on a fifteen pair cable. The splice was evidently made by someone inexperienced in cable work and the sleeve was evidently sealed with a soldering iron.

The records indicated that this splice was made in 1913 and when removed in 1924 after a little over ten



years' service did not show the slightest trace of moisture. It seems remarkable that such a crude piece of work should give such good service when many times a perfect appearing splice will go bad.—Contributed by Ray Blain, Telephone Plant Engineer.

Tracking Trouble to Source

Additional Data on Construction and Operation of Test Sets —A Table on Diagnosis and Location of Trouble — Where Instruments Go Wrong—Educate Subscribers to "Speak Up"

By P. Kerr Higgins

In a previous article the use and operation of the testing volt meter at the central office were described. In addition this instrument is frequently useful on outside work especially when it is necessary to test resistances. In general use, however, a standard magneto test set should be provided for every trouble man. As generally made the magneto test set is nothing more or less than a miniature telephone. Such a test set consists of a magneto generator, usually three bar to reduce weight, a buzzer movement, a transmitter, receiver and cord, and one or two cells of battery. A push button switch is usually provided for cutting the transmitter in and out of service. The whole equipment is put up in portable form, is convenient and light in weight, and is usually provided with a strap so that it can be carried over the shoulder or hung on a pole step or on a fence while making tests. This type of instrument is convenient for testing the line and for calling central or the subscriber, but it does not indicate the direction of the trouble, and in some cases it does not even indicate the nature of the trouble. To overcome these defects, several improved test sets have been placed upon the market.

Modern Test Sets Show Direction of Trouble

Test sets of a type designed to indicate the direction of trouble are pro-

Diagnosing and Locating Trouble

POSSIBLE LOCATION INDICATED

SYMPTOMS	Line	Central Office	Arrester	Receiver & Cord	Transmitter	Battery	Hook Switch	Condenser	Induction Coil	Ringer	Generator	Wiring	REMARKS:
1. Can't call or be called.	X	X	X									X	Test to see if open, ground or short.
2. Can call central but cannot be heard.					X	X	X		X				Test for open when subscriber tries to answer.
3. Can call central but cannot be called.							X	X		X		X	If condenser is in circuit with ringer.
4. Can hear but cannot be heard.					X	X	X		X			X	
5. Bell does not ring.							X	X		X	X	X	Examine springs of generator.
6. Line talks up badly.	X				X	X			X			X	Test resistance of line with inst. in and out of circuit.
7. Can't hear well.	X			X					X			X	Test resistance of line with inst. in and out of circuit.
8. Noisy line.	X	X	X	X	X	X	X		X			X	Test line for resistance and ground.
9. Bell rings when not wanted.	X			Examine	ground.					X			Test line for swinging cross.
10. Can be called but cannot hear.				X			X		X				
11. Rings others, but own bell weak.										X			
12. Open.	X	X	X									X	
13. Grounded.	X	X	X									X	
14. Short circuit.	X	X	X									X	
15. Rings others weakly, receivers O. K.											X	X	
16. Party don't answer.		Test line	with Vo	ltmeter t	o see if a	bnormal.							
17. Can't talk to other grounded lines.		X		Tip and	sleeve re	versed at	central	office.					Test with voltmeter to see which line is wrong.
18. Can't call central.	A	X	X		Test with	Voltmet	er.					X	
19. Noisy frying transmitter.					X		Poor or	burned c	arbon (to	o much	battery	perhaps).	
20. Cross talk between lines.	X	X	X		Examine	carbons,	also gro	und conn	ections.			X	Test line for insulation.

vided with a special key and tone or lamp. Fig. 1 shows the operation of one type of trouble locating test set. If used on a metallic circuit the wires attached to the two top terminals of the test set are fastened to the line wires as shown. If used on a grounded line, one of the test leads must be grounded. A special exploring coil connected to wires leading out of the set is hooked over the line wire on one or the other side of the test set leads. If this exploring coil wire is hooked over the line wire at the point A to the left of the test set leads, that is, on the side away from the trouble, no tone will be heard in the receiver when the special key is pressed. If the exploring coil is moved over to the right hand side of the leads, as shown at B on the diagram, the tone will be heard, indicating that the trouble is between the place where the test was made and the end of the line in the right hand direction. The principle embodied in this type of test sets is practically the same as that used in locating cable trouble with an exploring coil. The current in the wire under test furnished by the test set is picked up by induction in an exploring coil which is connected in series with the trouble man's receiver. In another type the terminals of the receiver are connected directly to the line wire. Both terminals of the receiver are connected on the same side of the test set leads but are separated by a little distance. A sound will be heard in the receiver only when the receiver is connected on the side toward the trouble.

Four Classes of Circuit Trouble

The principal troubles in the wiring of the telephone system may be classified under four heads—first, short circuits; second, open circuits; third, grounds; and fourth, crossed. The first and fourth are very similar except that in the case of a short the two wires crossed are parts of the same circuit, while in the case of a cross two distinct circuits are involved. Any one of the above may occur anywhere in the system from the ground at the telephone to the termination of the line in the switchboard at the central office. The trouble man must therefore strive to isolate and test separately each circuit or piece of apparatus involved in order to determine whether it is normal or out of order. If he starts from the office, he should detach and test the central office equipment before leaving the office, so that he is sure that the trouble is outside. If cable is used, he will then proceed to the end of the cable, open up the circuit at the terminal and test both ways. If the line from the central office is O. K. to this point, he will then proceed to the end of the line wire, open up and test in a similar manner, the final test being made at the instrument. In order to do this intelligently, he must have a test set with him, so that he may be able to get in touch with the central office or the subscriber as the case may be. It is apparent that the success of the tests largely depends upon the ability and limitations of the trouble man. An expert trouble man can usually eliminate a great deal of work by mere observation of the various parts of the apparatus, because of his previous knowledge as to how it functions under normal conditions. A list of twenty common cases of trouble is given herewith and indicates the most likely place where trouble of this character may be found.

A List of Instrument Troubles

It is a very difficult matter to give specific directions for locating and clearing particular cases of trouble in telephone instruments. There are many makes of telephone equipment and hence a wide variety of circuits used, so that information of a general nature only can be given.

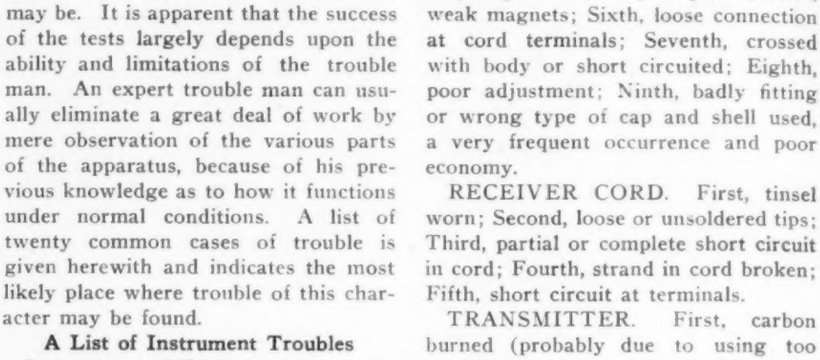


Fig. 1

The following is a brief synopsis of equipment and instrument troubles which might be helpful to the average repair man:

ARRESTERS. Many telephone men do not yet appreciate the importance of cleaning carbons after a storm. The writer recently was in the terminal room of a good sized magneto exchange in Missouri and during his entire stay he could hear the operators ringing the subscribers by the sound of the ringing current arcing to ground through the carbon dust. As a result the subscribers' bells did not ring as loud or as clearly as they should. By attending to this matter such complaints as "bell does not ring well" could be avoided in very many cases. The particles of carbon released by the lightning discharge cause high resistance leakage to ground between the carbons. Other sources of trouble are arresters not properly connected; a poor ground; ground left off entirely. These may be the cause of much damage such as open cable pans, ringers, induction coils, receivers, etc.

RECEIVER. First, open; Second, loose wire connection; Third, diaphragm froze or too close to the magnet; Fourth, diaphragm bent, rusty or pitted; Fifth, weak magnets; Sixth, loose connection at cord terminals; Seventh, crossed with body or short circuited; Eighth, poor adjustment; Ninth, badly fitting or wrong type of cap and shell used, a very frequent occurrence and poor economy.

RECEIVER CORD. First, tinsel worn; Second, loose or unsoldered tips; Third, partial or complete short circuit in cord; Fourth, strand in cord broken; Fifth, short circuit at terminals.

TRANSMITTER. First, carbon burned (probably due to using too much battery); Second, carbon packed; Third, loose, open or unsoldered connections; Fourth, open or short circuit in lead wires; Fifth, cross or short in transmitter. As a general rule it takes a transmitter specialist to make transmitter repairs, more especially those pertaining to the carbon electrode. Some transmitters use two lead-in wires, while others use the transmitter frame, body or arm as a return connection. Other troubles may be due to bent or corroded diaphragm; vibration damped by foreign matter, improper adjustment of damping springs; mouthpiece gone or poorly fitting.

BATTERIES. First, run down or exhausted; Second, poor or high resistance connections; Third, broken terminal; Fourth, leakage between cells through cover; Fifth, leakage in wires or receiver hook which does not open and close the circuit properly; Sixth, lead-in wires open or short.

MAGNETO. First, springs not properly assembled, or making proper contact or breaking properly; Second, reversed wiring on certain types; Third, weak magnets; Fourth, magnets not properly assembled; Fifth, shunt not operating properly; Sixth, open or short armature; Seventh, needs lubricating; Eighth, worn gear; Ninth,

vibration of armature; Tenth, gear meshing improperly; Eleventh, not enough magnets on generator.

INDUCTION COIL. First, open secondary; Second, open primary; Third, short circuited secondary; Fourth, short circuited primary; Fifth, wrong design used; Sixth, cross between primary and secondary; Seventh, loose connections.

RINGERS. First, freezing; Second, weak magnet; Third, poor adjustment; Fourth, loose connections; Fifth. open or partially open coil; Sixth, coil shorted or crossed with ringer frame; Seventh, on harmonic lines, the wrong frequency ringer used; Eighth, on selective party lines, wires reversed. The same is true where a push button is used for calling central.

CONDENSERS. First, open; Second, short; Third, loose connections; Fourth, wrong capacity used.

HOOK SWITCH. First, springs not making proper contact; Second, springs not assembled correctly; Third, loose or open connections; Fourth, dirty or burned contact points; Fifth, lever sticks or does not operate freely; restoring spring tension is not strong enough; Sixth, bad contact points. They should be of platinum, silver or tungsten. Old-type switches not having contact points of these metals are usually very unsatisfactory and the source of much intermittent trouble.

WIRING. First, joints made through hinges giving poor connections. When connections are made in this manner, they should be equipped with contact springs. Second, exposed wires on back of cabinet, a prolific source of trouble, especially on damp walls; Third, poor insulation on lead-in wires causing crosses or short; Fourth, broken wires; Fifth, poor joints or unsoldered connections.

GROUND. First, high resistance in the earth; Second, high resistance in ground rod; Third, badly located ground; Fourth, poor connection.

DESK SETS. First, wrong connections of bridging desk set in which the transmitter and receiver are connected up in series with a primary circuit with no break, causing the battery to run down; Second, wrong connecting of bridging desk set whereby the receiver is in the primary circuit and the transmitter is in the secondary circuit; Third, wrong connections for bridging desk sets whereby the transmitter and receiver are connected in series in the secondary circuit. The above will show the necessity of great care being taken in connecting up a desk set so that all its parts will be functioning properly. Usually instructions are sent with such equipment and they should be carefully followed. If not sure then the circuits should be tested out so that they may conform with desk circuits shown in these articles.

Non-Mechanical Trouble

All telephone troubles are not due to faults or disarrangements in the equipment or plant. In a large number of cases, the subscriber himself is at fault, not only because he does not speak directly into the transmitter, but frequently leaves the receiver off the hook or hangs something on the hook which prevents it from functioning normally. Where exposed binding posts are used the writer has frequently found metallic substances placed on top of the instrument, such as scissors, alarm clocks, snuff boxes, tobacco boxes and many other metallic articles too numerous to mention. The placing of these articles are liable to cause either a dead ground or short or an intermittent trouble, which is still more aggravating.

In other cases, the writer has found the telephone directory hung on the switch hook, which of course did not permit the hook to raise to its normal position and as a result while the subscriber could call central he could not hear or be heard. In addition to this subscribers are frequently careless in answering their telephone when the bell rings and in some cases they have been known to put paper between the hammer and the gong and forget to take it out. On rural lines the habit of subscribers in hooking and unhooking the line outside the residence before or during a storm is also a prolific source of trouble.

Some Troubles are Due to Poor Voice of Speaker

The average trouble man is frequently annoyed by complaints of "Cannot hear subscriber" and unfortunately in a large number of cases the remedy is difficult to apply by reason of the fact that it is due to the person using the telephone having a poor quality of voice or not speaking directly into the transmitter. At one end of the line speech itself is received in the form of acoustic waves. A change then takes place whereby part of the energy of speech is sent over the line in the form of electric waves. At the end of the line this electrical energy is again transformed and emerges as human speech. The problem therefore is partly acoustic, and depends to a considerable extent upon the quality of the human voice transmitting the message and also the closeness of the speaker to the mouthpiece of the transmitter. Results of tests made in the latter are shown in the following table. The loss in transmission is expressed in terms of miles of standard cable and in the equivalent miles of non loaded open wire.

Distance of mouth from transmitter mouthpiece.	Loss in miles of standard cable.	Loss expressed in miles of No. 10 B. & S. copper wire line.
0.5 inch	3.6 miles	45 miles
1.0 inch	11.0 miles	137 miles
1.5 inches	17.0 miles	212 miles
Limit of commercial transmission.	32.0 miles	400 miles

It is evident therefore that if the speaker's lips are held half an inch away from the mouthpiece of the transmitter, the volume of the resulting transmission will be reduced to an amount equivalent to talking through a No. 10 B. & S. gauge copper wire forty-five miles long. The importance, therefore, of educating subscribers into the habit of talking as closely as possible into the mouthpiece cannot be emphasized too much.

A Routine Test for Local Battery Instruments

Keeping in mind what has been said in this and previous articles, a routine method of making a complete test of a magneto instrument may now be given. There is an advantage if the trouble man cultivates the habit of making these tests in the same order and goes through them whenever he visits an instrument. First, short circuit the line terminals, take receiver off hook and hold same to the ear; tap or blow into the transmitter mouthpiece and note the amount of side tone heard in the receiver.

The second test with the short circuit removed is to turn the generator crank, still holding the receiver to the ear and observe the ringing current through the receiver. The third test is having the receiver still to the ear, pull down the switch hook with the other hand and notice that the side tone from the transmitter is completely eliminated, indicating that the switch hook is cutting the transmitter in and out. The fourth test consists of turning the generator crank with the receiver still to the ear and the hook held down. This is to see whether or not the ringing current passes through the receiver when hook is down. Normally this should not take place. The fifth test consists of opening the primary circuit at some convenient point, for example, at the dry battery or at the transmitter and connecting up the receiver in series with the transmitter, battery, primary of induction coil, and switch hook. Then by manipulating the switch hook with the hand it can be noted whether or not the battery circuit is being operated properly. In this test when the switch hook is down, there should be no side tone and no click in the receiver. When the receiver is let up, there should be a decided click and the side tone in the

transmitter should be distinctly heard.

Some Additional Instrument and Circuit Data

In preceding article a number of instrument circuits have been shown,

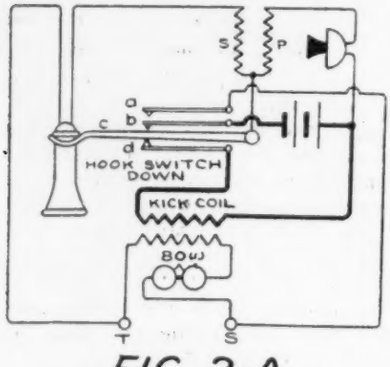


FIG. 2-A
KICK COIL TYPE
HOOK DOWN

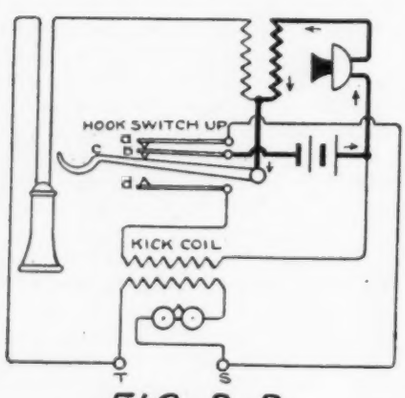


FIG. 2-B
KICK COIL TYPE
HOOK UP

both desk and wall type in order that the student or trouble man may familiarize himself with them, and be able to pick out the particular type

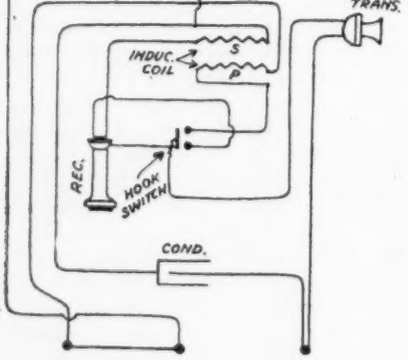


FIG. 3
INDUCTION COIL
TYPE C. B. TELEPHONE

which he is using at his exchange. In submitting these circuits, we will try to cover every modern make of telephone possible. In this article there are shown two diagrams of the kick coil type of telephone, Figs. 2a and 2b. This type of telephone is still used in many exchanges and is used to give common battery signalling on local bat-

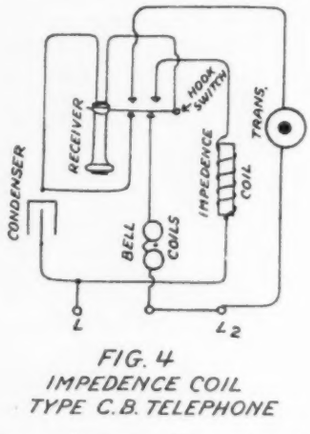


FIG. 4
IMPEDENCE COIL
TYPE C.B. TELEPHONE

tery exchanges. The writer does not recommend its use in the form shown and it is only shown for the benefit of those who may favor its use. Fig. 3 shows a popular induction coil type common battery telephone. Fig. 4 shows an impedance coil type common battery telephone. Fig. 5 shows a bridging wall telephone, while Fig. 6 shows a bridging desk telephone using a 3-conductor cord. The following table shows the resistance in ohms, size of wire used and number of ampere turns on different types of ringer coils and generator armatures.

	R. Ohms.	Size of Wire	No. Turns
Series magneto ringers..	80	No. 30 B. & S.	4,600
Series magneto generator armature...	500	No. 34 B. & S.	4,500
Bridging ringer coils....	1,000	No. 36 B. & S.	12,960
Bridging armature coils.	275	No. 32 B. & S.	3,900

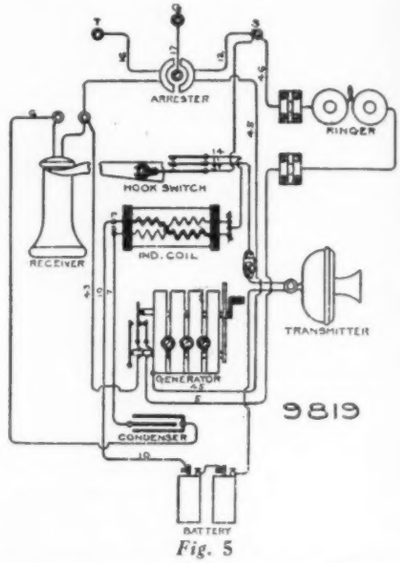


Fig. 5

The Union Telephone Co. has been incorporated at Hartford, S. D., by B. F. Lansing and others.

At the annual meeting of the Illinois Telephone Co., at Jacksonville, Ill., recently, a building program of $19,000 was announced for 1924. This appropriation is exclusive of the rebuilding of Roodhouse into a cable plant which is now in progress.

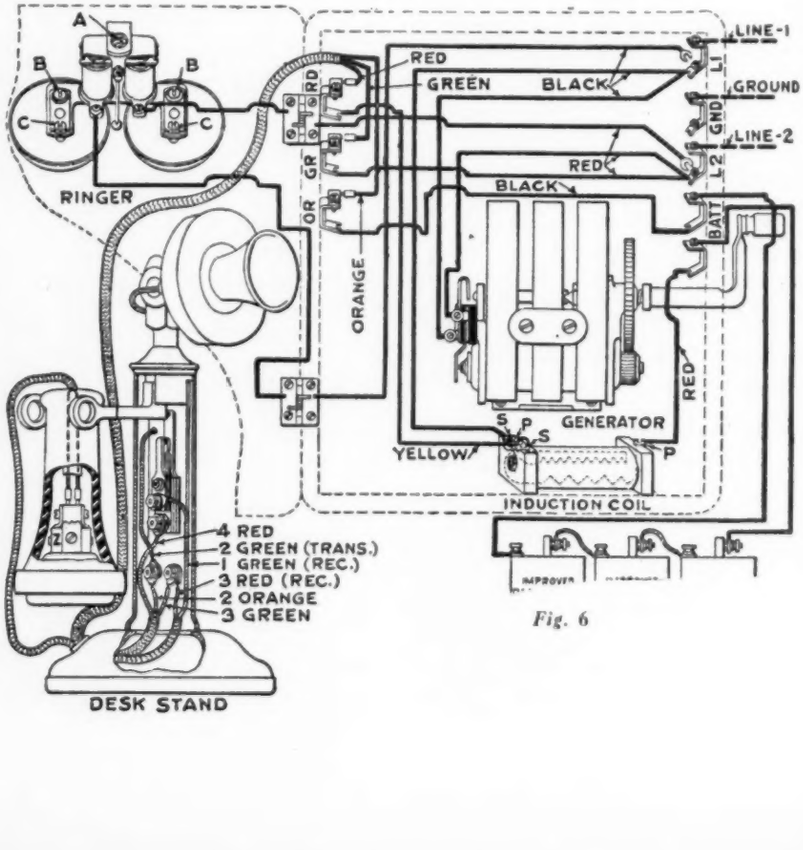


Fig. 6

Valuation in Rate Making

Chapter XVII—Non-Physical Assets

By CHARLES W. MCKAY, Associate Editor*

To diverge, for a moment, from the subject now under discussion (the subject of non-physical assets) — the thought suggests itself to the writer that the present phase of our consideration of the general subject of this series may prove rather "dry reading" —unless the reader is making an especial study of rate and valuation problems. It may be well therefore to repeat a suggestion made at the beginning of the series.

The writer has had a rather varied experience in the solution of rate and valuation problems—for both large and small companies and he realizes full well that many of the smaller companies cannot afford the services of high-priced rate-experts—in connection with the preparation and presentation of their cases. Furthermore, the writer has long felt that the fundamentals of the valuation-rate problem could be so presented (in serial article form) as to enable the small company manager to minimize the expense involved in the retention of high-priced engineering talent—by doing a large part of the work himself. It was this thought that prompted the present series—and the results to date (as expressed through the media of readers' comments) would seem to justify the time and work involved in the preparation of the series.

However, a thorough groundwork for rate-valuation work can not be laid unless one presents a rather comprehensive exposition of the underlying theories. It is suggested, therefore, that the reader follow this portion of the series carefully—and if, perchance, his daily duties have prevented him from a careful perusal of the installments immediately preceding—it is further suggested that the reader review these installments carefully. These suggestions are made, at the present time, for a special reason, to wit:—after we have completed our consideration of the theories involved in valuation and rate making problems it is the writer's purpose to present an intensely practical outline of the exact methods of procedure involved in the preparation and presentation of a rate case. Naturally, if the reader has followed, closely, the portion of the text which has to do primarily with theories he will more readily grasp the significance of the practical suggestions offered in the articles which are to follow.

To return to the subject in hand—the subject of non-physical assets—we have considered nearly all the "intangible" elements of value save the following:

1. The value of good will.
2. Franchise values.
3. The values inherent in contractual relations.

Concerning "Good Will"

The writer can picture the reader's astonishment at the mention of "good will" as a factor in telephone valuation work—especially in view of the fact that he (the writer) has already stated that good will is a negligible factor in connection with valuation for rate making purposes. At this juncture, therefore, it may be well to repeat and emphasize this statement to avoid the possibility of a misunderstanding on the part of the reader. It is commonly conceded that good will has no place in the valuation for rate purposes, of a monopolistic utility. In these days the telephone industry is essentially a monopolistic utility. Independent telephony is in a stronger position financially and morally than ever before—and yet most of the Independent companies are not competitors of the Bell system. This is due to the "division of territory" program which has been prosecuted so vigorously during the past five or ten years. In many communities where, a little over ten years ago, we found two telephone companies (an Independent and a Bell company) both fighting for dear life to maintain, even a semblance of, financial stability—we now find a prosperous Independent company occupying the field alone.

In discussing the subject of good will, one is bound to revert to Lord Elden's famous comment. "Good will," says Lord Elden, "is nothing more than the probability that the old customers will continue to resort to the old place of business. It involves an element of personal choice and is inappropriate where there can be no choice and therefore should be given no value (in the latter case)."

This comment of Lord Elden is cited in nearly every court and commission case where the element of good will is involved.

Circumstances may arise however, involving the purchase or sale of telephone property—where the element of good will is a factor to be reckoned with.

To illustrate, the writer happens to know of a case where a prosperous Independent telephone company wished to purchase an adjacent property belonging to a Bell company. It so happened that the physical property of the Bell company (the poles, wire, cable, etc.) had been allowed to depreciate to such an extent that the residual physical value was almost negligible. Nevertheless, the Bell property had one most important asset—it had subscribers. In other words it had an established business. Furthermore, there were many people in the small community served by the Bell company who were prospective telephone subscribers—but who could not be accommodated—due to lack of facilities. It also happened that both of the properties cited in the illustration were located in the state which did not have a public service commission.

When the deal was finally consummated the Independent company paid the Bell company a relatively small amount for its physical property (which, as previously stated, was in a depleted condition); a substantial allowance for going value or cost of establishing business and over and above this allowance remuneration for "good will."

In substantiating the payment for good will—in connection with the foregoing transaction — the Independent company cited the following court decision—a decision handed down in a frequently quoted industrial case and one which featured the element of good will.

"The intangible values of the common stock of a company are not easily ascertained. Such values are always speculative and uncertain, and, being unknown quantities, are difficult to deal with. The difficult nature of the task does not, however, relieve me of the duty of finding such value from the

evidence in this case. The patents, patent licenses, trade marks, contracts, prospective future business, and the **good will** of the company, are of substantial value. Good will is in fact, a fixed asset, the value of which is, to some extent, dependent upon the profits earned, its fluctuations being consequent upon, and not a cause of, the earning of profits. Good will represents the value of the trade name, business connection, and organization of the undertaking. When dealing with things which exist in the uncertain realms of possibility any conceivable result is attainable. A conclusion can only be true and correct when the premises of the syllogism are faultless. The intangible values of this stock can not be found in a manner so entirely satisfactory. I am not impressed with the idea that the defendant should have paid plaintiff a handsome price for her stock, basing such price largely upon intangible values. Such values are hard to capitalize. He should, however, have been fair and I am of the opinion that, to be so, he should have paid a reasonable valuation of the tangible and intangible values of her stock. From the evidence, these intangible values cannot be found to be less value than $600,000. It is argued that the business of the company was hazardous and speculative, and that intangible values should be dealt with as things uncertain. But if these values have wings, the defendant knew it when he had plaintiff execute the articles of trusteeship, and later, when he himself acquired title to the patents. Did the license to the company mean nothing to it, and had the patents no value or possible value to him? If not, he need not have had plaintiff divest herself of her rights and title therein. I am not unmindful of the risk, the hazard, and the uncertainties which attend investment in industrial stocks. Were it not for these considerations, and could it be said with reasonable certainty that the prosperity of the company would continue, these intangible values would require a much higher valuation.

"Good will is an asset in a class by itself. Its intangible nature makes it an excuse for manipulation. The difficulty in dealing with this item is in the measurement of its value. It is uncertain, but the **courts protect it and declare it to be an asset.** Business men and theorists insist that it be treated as property. Negotiable good will is the exception rather than the rule in business. Can the value of good will be anything more than each man's guess? Emerson said, 'Every successful business is the lengthened shadow of some one man.' Good will depends upon varying contingencies and upon numberless factors whose vital value may change with the moon. **But there are rules for measuring it** (good will) which have been met with favor. The factors which go to make up good will are competition, patent rights, reputation for integrity, the personnel of the directorate, trade names, market conditions, pending orders, location, publicity, credit, and annual earnings. These are the props upon which good will is reared. All these factors contribute to the earnings of profits. The most satisfactory manner of determining the value of good will in dollars and cents is to take the average yearly earnings over a period of three to five years of uneven earnings as a basis. From this must be deducted interest at the rate of seven per cent on the average capital employed in such years. In this way we ascertain the actual surplus profits of the business. How many times, then, should these surplus profits be multiplied to get the value of good will? The answer can only be found in the peculiar facts in each case. I do not consider that in any case (except perhaps one of monopoly) the multiplier should be greater than two. In this case, the average earnings covering a five-year period are shown to have been $620,-219.62."

The writer wishes to place himself on record as citing the foregoing illustration **for illustration purposes only.** He does not wish to condone nor condemn the inclusion of an allowance for good will in the evaluation of a telephone property—even when such a value is made for sales purposes only and where the companies involved are not subservient to commission control. However, now that we have touched upon the subject of good will it may be well to amplify the discussion. One especial reason for so doing is that many Independent telephone executives are interested in other lines of business endeavor. These executives may derive benefit from the suggestions offered herewith—in connection with their outside business.

In a recent decision the Court said: "The factors which go to make good will are competition, reputation for integrity, personnel of the directorate, trade names, market conditions, pending orders, location, publicity, credit, and annual earnings."

The writer has compiled a resumé of a leading court decision with respect to the method of determining the value of the Non-Physical Assets.

In the case of Von Au versus Magenheimer (100 N. Y. Supp. 659) the plaintiff, Tillie Von Au, as executrix, brought an action against the defendants to recover damages for false representations, whereby the denfendants induced her to sell 483 shares of the capital stock of the Mason Au Magenheimer Manufacturing Company, for the sum of $50,000. The capital stock consisted of 1,500 shares—$100 par value each. The tangible assets as of July 1st, 1900, amounted to $167,666.50, but this was reduced in July by $4,500—a 3 per cent dividend. Of the tangible assets $91,485.13 consisted of the value of the buildings. No allowance was made for good will in purchasing from the plaintiff. The jury fixed the value of good will at $199,725.

The book value of the good will carried from 1891 to 1895 was $20,000. The average net earnings from 1891 to 1900 was $25,111.20. The Court expressed its opinion as follows:

"After deducting interest on the value of the good will as found by the jury, it will be found that it would require the application of the entire net profits for more than thirteen years to reimburse a purchaser who paid the sum allowed by the jury as the value of good will, during which time he would receive no value from his investment."

(The Court went on to say that thirteen years was excessive, unless the business constituted a monopoly.)

"The industry of counsel has not resulted in the citation of any case in this country in which a specific rule for the determination of the value of good will is declared. No rigid and unvarying rule can be laid down by the courts in this class of cases. Each must be considered and determined in the light of the facts surrounding and connected with it. Within proper limits, the determination of such question must be left to the jury, but their conclusion must rest upon evidence legitimately tending to establish value and supporting their verdict. Our courts have not adopted the rigid rule, established by the English courts, of limiting the value of good will to one year's purchase of the net annual profits of the business, calculated on an average of three years (Mallerish versus Keen, 28 Beav. 453), or that three years' net profits of a business arbitrarily represents the value of its good will (Page versus Ratcliff, 75 Law Times Rep. 371), but on the contrary, incline to the more equitable rule that the value of good will may be fairly arrived at by multiplying the average net profits by a number of years, such number being suitable and proper, having reference to the nature and character of the particular business under consideration, and the determination of such proper number of years should be submitted to, and determined by the jury as a question of fact, dependent upon the

evidence before them in each action. It cannot be determined by courts as a question of law.

"I am not aware of any principle of law, adopted by the courts of this or any other country, which would sustain a good will value of $199,725, in a case where the net value of the entire property and assets of the corporation amounted at the most to but $163,-166.50.

"Judgment and order reversed and new trial granted, costs to abide the final award of costs."

This case was finally referred to the Appellate Court of New York and, after much argument, pro and con, a substantial allowance was made for the item of good will. The case is a famous one and establishes a precedent. Possibly the true significance of the method finally adopted by the court, in placing a value on the item of good will may be clarified by the following simple illustration.

We may assume that an industrial property has an appraised, physical value of $2,000,000 and, furthermore, that a detailed investigation of the company's books shows that it has maintained a net average annual income of $250,000—for at least five years preceding the date of the investigation. A fair return, at 8 per cent on the $2,000,000 investment in physical property, would be $160,000 per annum. However, the records show that the company has maintained an income in excess of $160,000 per annum. The excess—$90,000—must have been produced by something. This "intangible something" which produces the excess income, over and above the 8 per cent return, is entitled to capitalization—the amount of capitalization being dependent upon the stability of the enterprise under consideration. If we find that the excess earnings have been stable over a five, or more, year period, and that they are likely to continue at the same rate, we may be warranted in granting a twenty per cent capitalization. In other words—and adhering to the language of the Courts in the cases referred to—we may adopt a "multiplication factor" of five. Five times $90,000 is $450,000. Therefore, we find that the value of the non-physical assets is $450,000—and this added to the $2,000,000 valuation of the physical property would give a total of $2,450,-000. It is thought that the foregoing illustration will serve to clarify the general method of procedure—as established by court precedence.

Just a word in summing up the subject of good will—remember that a monopolistic utility (and most telephones are monopolistic utilities) cannot include good will in a valuation made for rate purposes. Nor is it advisable to include good will in a valuation made for other purposes unless one is quite sure of the reaction on the part of the state commission.

Value of Contracts or Agreements

It frequently happens that operating utility corporations have exceedingly profitable contracts or agreements with other utilities. A telephone company, for instance, may have an agreement with the local electric light company providing for the free use of the latter's poles throughout an entire section of a town. Usually an agreement of this kind is reciprocal, the electric light company, in return for its concession being granted the privilege of the free use of an equal number of telephone poles.

Undoubtedly agreements of this nature are exceedingly profitable to the beneficiaries, obviating, as they do, appreciable outlays for pole plant.

Attempts to assign a value to contracts and agreements in rate-base appraisals have met with the almost universal disapproval of courts and commissions, except in cases where the utility corporation can show that the securing, or carrying out, of such contracts involved actual expenditures.

One notable exception to this rule is found in the case of the Union Electric Light and Power Co. of St. Louis. This company was permitted by the Public Service Commission of St. Louis to capitalize at 8 per cent the rentals saved through an agreement with the local telephone company involving the free use of the latter's poles. The total contract value assigned was $80,000.

Where actual costs are involved in the securing or carrying out of an agreement, as a rule, there is a little difficulty in convincing public utility commissions as to the propriety of including such costs in a rate-base appraisal. In the case of a telephone company these costs usually consist of the salaries, carfare and incidental expenditures of the special agents employed in securing the agreement, and any payments the telephone company may make to the foreign company to cover the expense of re-arranging the latter's interests to provide room for the telephone company on the poles that are to be jointly used.

Franchise Values

The valuation of franchises has long been a bone of contention between utilities and regulatory bodies. Looking at the matter solely from the standpoint of the utility, there would seem ample justification for contending that franchises have an appreciable monetary value.

The franchise is the foundation upon which the whole utility structure is built. Take away the franchise, and the most prosperous of properties becomes a mere mass of second-hand material worth only what the junk dealer can be induced to pay for it. Indeed, many items of plant, such as underground conduit, involving large initial expenditures and of great value to the company throughout its life as an operating utility, become absolutely worthless the moment the franchise is revoked.

It would seem, then, that the franchise must be one of the most valuable assets of a utility corporation, inasmuch as the very life of the company is dependent upon its preservation. On the other hand, from the standpoint of the commissions, and from that of the public they represent, there is an equally good argument for debarring, from a rate-base appraisal, all franchise values except those representing actual costs incurred in securing the franchise.

Franchises are in the nature of a gift from the people. It is obviously most unfair, therefore, to ask the people, or those of them who are utility patrons, to pay rates based upon the capitalization of their own gift.

This represents the general attitude of courts and commissions on the subject of franchise valuation; the value assigned to franchises in a rate-base appraisal shall be limited to the actual expenditures incurred in securing such franchises.

The question of franchise value affords an excellent illustration of the difference which may exist between total value, or "fair value," and value for rate-making purposes. In acquiescing to a commission's ruling that only actual costs shall be included in a rate-base appraisal as the value of its franchise, the company may contend—and very properly so—that the actual fair value of the franchise is far greater than any possible cost incurred in securing it, and that the value thus assigned is a rate-base, rather than a total fair value.

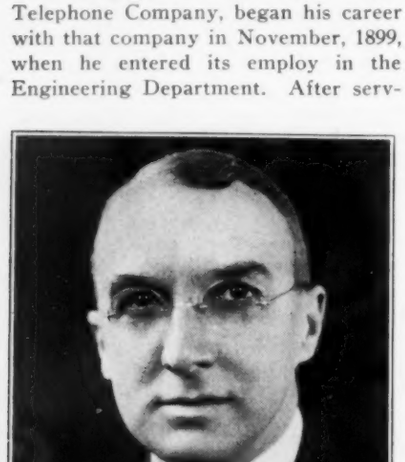
The equity of this method of evaluating franchises cannot be questioned. It would seem, however, that in return for waiving any claim for greater values, utility corporations should receive the maximum of protection at the hands of municipal and state regulatory bodies in the matter of franchise renewals, so long as the companies conduct themselves in such a manner as to warrant public confidence.

The legal cost involved in securing franchises has already been discussed. There remains, therefore, for consideration next issue only such other expenses as may legitimately be involved in securing a franchise. These usually are of a minor nature, excepting in municipalities where one bids for the franchise privileges.

New New York Chiefs

Careers of H. C. Carpenter and George W. McRae, Recently Advanced in Gotham Ranks

New York, N. Y.—Henry C. Carpenter recently elevated from the position of Chief Engineer to that of General Manager of the New York Telephone Company, began his career with that company in November, 1899, when he entered its employ in the Engineering Department. After serv-



H. C. Carpenter

ing in many capacities and through successive steps of promotion, on July 1, 1912, he was appointed Engineer and from that position directed the engineering operations of the organization.

On October 29, 1919, Mr. Carpenter was appointed Chief Engineer of his company at a time when it faced the severest crisis since the early days of the telephone. At the end of one year's government control, telephone properties had been returned in August, 1919, to their private management and ownership, with working forces depleted by war causes, and with the reserve apparatus and materials used up because wartime demands had been met but no new construction had been permitted.

By 1923 the storm of Demand versus Supply had been weathered by the New York Telephone Company by construction efforts in building new telephone plant which broke all previous records.

An important event in telephone history took place during 1922, and under Mr. Carpenter's direction as Chief Engineer, New York City was given its first machine switching central office.

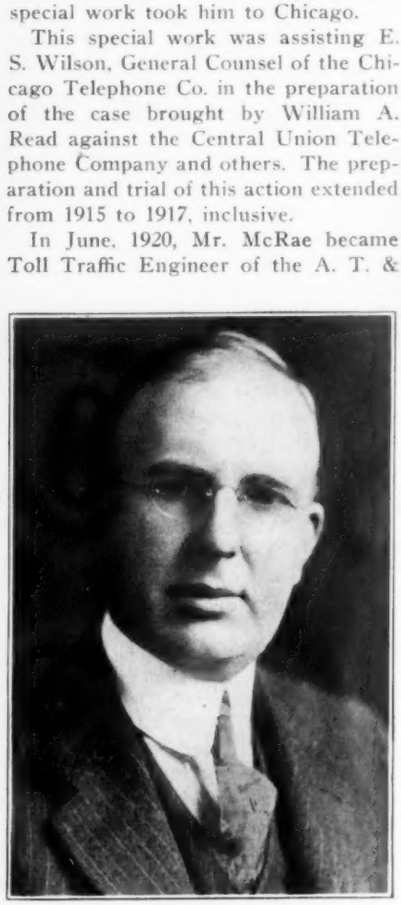
Mr. Carpenter was born in New York City July 3, 1878, and graduated from Columbia University in 1899.

George Wadsworth McRae was born in Malden, Massachusetts, where he received his preliminary education in the public schools and high school. After graduating from high school he entered the Massachusetts Institute of Technology, from which he was graduated in 1910 with the degree of Bachelor of Science in Electrical Engineering.

Immediately after graduating Mr. McRae became connected with the American Telephone and Telegraph Company at New York, in the toll traffic engineering branch. He rapidly became familiar with the details of toll traffic engineering work, being successively engaged in almost every branch of the work for about five years after entering the company, when special work took him to Chicago.

This special work was assisting E. S. Wilson, General Counsel of the Chicago Telephone Co. in the preparation of the case brought by William A. Read against the Central Union Telephone Company and others. The preparation and trial of this action extended from 1915 to 1917, inclusive.

In June, 1920, Mr. McRae became Toll Traffic Engineer of the A. T. &



G. W. McRae

T. Company, reporting to K. W. Waterson, Assistant Chief Engineer. On April 1, 1922, he was appointed Chief Engineer of the Illinois Bell Telephone Co. On December 12, 1923, it was announced that he had been appointed Chief Engineer of the New York Telephone Co.

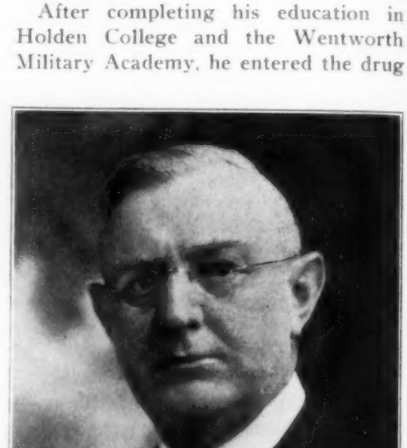
Bellefontaine, O.—$130,000 is to be spent by the Union Telephone Co. here.

Golladay a Builder

Missouri Telephone Man Heads Flourishing Group of Local Enterprises

Holden, Mo.—M. L. Golladay, this city, is the foremost financial factor in the town in which he was born, September 9, 1870.

After completing his education in Holden College and the Wentworth Military Academy, he entered the drug



M. L. Golladay

business, at the age of 18, with his father. Upon the death of his father he became head of the drug business, which he sold in 1920.

Mr. Golladay entered the telephone business in 1899 as the principal factor in the Holden Home Telephone Co. His interests eventually extended to other businesses; in 1910, to the automobile business, in 1913 to an ice plant and steam laundry, and in 1916 to the farming and stock raising business.

In 1918, he incorporated his various interests in the Golladay Investment Co., of which he is president and Managing Director, operating the Holden Home Telephone Co., a system of four exchanges, The Holden Ice & Fuel Co., The City Garage, Hillcroft Farms and The Holden Auditorium Co.

He has three sons, all with college educations; the oldest designing engineer with the Westinghouse Electric Co., Pittsburgh, Pa., the second a mechanical engineer managing the City Garage, and the third an efficiency engineer with the West Penn Electric, Connellsville, Pa. All three have been given their Master Mason degree by their father who is a Scottish Mason and Shriner.

Neb. Debates Interference

Difficulties of Day's Work Discussed at Meeting

Nebraska's officers: C. L. Kelly, North Bend, President; E. B. Wait, Comstock, Vice-President; George E. Becker, Secretary-Treasurer.

Directors: For three years: E. B. Wait, Comstock; R. E. Mattison, Lincoln, and L. B. Wilson, Omaha.

For two years: Warren Pratt, Kearney; George E. Becker, Pawnee City, and Elen D. Warner, Scottsbluff.

For one year: Dr. W. A. Shreck, Bertrand; C. L. Kelly, North Bend, and H. C. Bratt, Albion.

Omaha, Neb.—Mark T. Caster, plant superintendent of the Lincoln T. and T. Co., and J. B. Hill, general manager of the Continental Gas and Electric Co., engaged in a spirited debate on inductive interference as one of the lively features of the annual meeting of the Nebraska Telephone Assn. held here Feb. 12.

During the cross-fire interesting features were brought out stressing the importance of knowing how to promptly overcome inductive interference, and of acquaintance with the work done by the joint general committee of the Bell and the National Electric Light Assn.

"Will the farmer pay for metallic circuits?" The telephone men maintained it would be a tough job, while the power-line representative took the stand that the farmer would come across, if the case were properly presented to him. The farmer must choose between more expensive telephone service and the necessity of going without farm power and light at a reasonable figure, so Mr. Hill said.

Mr. Caster brought up the distribution of power and light electricity through direct current, a method he understood was made possible by recent developments in electrical engineering. The adoption of this system, according to Mr. Hill, who admitted he was unacquainted with its details, probably would involve an expense far greater than that of construction metallic telephone circuits.

A "Relations" Platform

Utility customers in Nebraska have been made friends of the utility companies by the good service, reasonable rates, and incessant education done by the corporations, so H. F. McCulla, commercial engineer of the Lincoln company pointed out.

As a platform for improving public relations, Mr. McCulla suggested:

"First.—Is is obvious to all of us that the rendering of a first-class service is the first requisite.

"Second.—Frankness. Our policies, plans, aims and ambitions are all open and aboveboard, and we propose to tell them to the public through every possible medium.

"Third. — Confidence, wholehearted and absolute.

"Fourth.—Selling our own employes on the policies and practices of the company.

"Fifth.—Then let every employe assume some responsibility in meeting the public. Let each employe realize that he represents the company in the eyes of the public.

"Sixth.—Be proud of your company —and show it.

"Seventh. — Hair-splitting adjustments. Be fair and just in all financial dealings with the public, but do not be so shortsighted that you overlook in the problems of the present the final reaction to your policy in the future.

"Eighth.—Put yourself in the other fellow's place."

Before a rate increase action is formally started the necessity for the increase should be laid before the subscribers and their fairness and good will will make the raise easier, remarked H. T. Dobbins, associate editor of the State Journal of Lincoln.

Mr. Dobbins mentioned automobile ownership as the factor which had acquainted the public with depreciation as a legitimate item in utility charges. He also spoke of the good-will building feature of consumer ownership.

H. G. Taylor, for 12 years a member of the Nebraska State Railway commission spoke of the history of the telephone industry and outlined how the body upon which he serves has worked for the betterment of the telephone business and its patrons.

Tax problems were straightened out for many by the address of Charles E. Hall, tax commissioner of the Northwestern Bell. He also spoke on the national tax situation, and its political aspect.

"Protecting Your Investment and Income" was the subject of the talk make by Charles L. Knox of Omaha, which emphasized the importance of insurance in telephone company operations.

To Have Field Secretary

Among the important matters receiving convention action was the selection of a paid field secretary and financing his work. Action is to be taken in completing the preliminary plans made at the convention, within the next two months.

Greetings from the national association, brought by secretary C. C. Deering, ten minute talks made by various members, and the discussion of the contents of the question box were features of the closing session.

A demonstration of manual and machine-switching was conducted under the auspices of the Northwestern Bell.

A banquet given to the convention by the Northwestern Bell provided the entertainment high-light of the meeting.

A Business Clinic in Ohio

Experts in Making Healthy Companies Convene

BUCKEYE OFFICERS

Frank A. Knapp, Bellevue, President.

Conrad Kipp, Greenville, Vice-President.

Frank L. McKinney, Columbus, Sec.-Treas.

Directors: Harvey Allen, Portsmouth; W. L. Cary, Newark; C. L. Jones, Athens; Conrad Kipp, Greenville; Frank A. Knapp, Bellevue; Earl Lutz, Circleville; Frank L. McKinney, Columbus; Geo. H. Metheany, Lima; E. G. Miller, Warren; W. A. Norton, Kenton; George B. Quatman, Sidney; J. Warren Safford, Troy; Fred L. Sears, Cambridge; Harry Sotzen, Shelby, and G. P. Thorpe, Wilmington.

Columbus, Ohio.—How definitely a live telephone association serves its members was summarized vividly at the annual convention of the Ohio Independent Telephone Association, held here Feb. 19-21.

For the same dues that were set more than 25 years ago the Ohio association continues to extend its scope of service to its members. During 1923 more than 10 times the cost of operating the state association was brought into the coffers of the Independent telephone companies of the state through the increased compensation for connecting companies, arranged at conferences between the Ohio association and Bell officials. Details of this achievement and of the Ohio Bell's plea for an increase in long distance rates authorized by the state regulatory body, were features of the presidential address of Frank A. Knapp, who was re-elected at the 1923 session. This Bell increase will be shared with connecting companies. The prospects are bright for the approval of higher rates as an investigation has shown them warranted.

Around 500 telephone men attended the Ohio affair, and listened to a

notable address by President Knapp, which opened the formal program.

The president spoke of the timely protection against inimical legislation afforded by the association's efforts, and of the unceasing vigilance maintained against legislative threats.

Rewards of a well paid and capable management were epitomized by Mr. Knapp. Taxation, advertising, and wider distribution of telephone securities were pithily covered in his address. He paid tribute to the performance of Frank McKinney in making certain that association members got good value from the organization.

In Secretary-Treasurer McKinney's report it was stated that the increase in the association's membership more than made up for the loss suffered when the Ohio State Telephone Co. went out of business.

During his statement relative to the activities of the National Independent Telephone Association, President MacKinnon of that organization called attention to the income tax service of the national association, and to its other timely values to member companies. In analyzing the situation in Ohio, Mr. MacKinnon said that the statements of 51 Ohio Independent companies showed that their plant investments had been increased $5,500,000 in the six years beginning January 1, 1917, but the average net income per station per year had been increased only 80 cents during that time.

"Way Back When" in Ohio

Recollections of the early days of Independent telephony in Ohio were related by W. Gilbert Thompson of Lebanon, who told of the handicaps of business ignorance and lack of capital and qualified technical men, that marked the infancy of Independent telephony in Ohio. He related, to the evident brightening of the memories of many of his hearers, details of his particular miseries with the infantile ailments of the company that drafted him as its head.

He told of the troubles of the pioneer Independent manufacturers, who he said, "knew more about our affairs and our requirements for the future than I ever had dreamed of." He quoted the significant remark of P. C. Burns of the American Electric Co., "You are just like the others—in a hundred thousand dollar business on a rain-check. . . . We will take care of you even if we have to go broke." Kellogg, Stromberg, Valentine-Clark, Roebling, and others all extended the helping hand. That aid, with the good done by the association's organization and the settlement of the brawl with the Bell, utilized by men who painfully and thoughtfully worked out a successful destiny of Ohio Independent telephony, Mr. Thompson recorded as history.

A mutuality of interest between Independent and Bell companies was presented by the new chief of the Ohio Bell, Charles P. Cooper. Mr. Cooper forecast a long and mutually prosperous future for the present alignment in Ohio, and spoke of the company's confidence in the fairness of the Ohio subscribers in accepting rates that would be profitable and encouraging to telephone companies. He spoke of the toll revenue situation and invited the help of the Independents in getting rates that would give both interests a profit.

"Development Work in 1923" revealed the work of several active members of the Ohio association. In the remarks of E. G. Miller of Warren the necessity of a plant appraisal that gave the utility credit for the full value of its plant was strongly put forth.

Several of the members gave interesting opinions on depreciation. J. O. Campbell, Norwood, spoke of the work the Knapp properties did during 1923, and told what had been accomplished by judicious and persistent publicity in the territory under his supervision.

Another topic covered by several members was "Reorganization and Refinancing as a Protection to Stockholders and a Benefit to the Public." The complex nature of the telephone business and the importance of co-ordinating the work of each department were featured in the remarks of F. L. Sears, Cambridge. He expressed the opinion that financial matters were too frequently neglected by the Independent executive. The comparative newness of the telephone business, he believed, was responsible for many of its difficulties. He strongly recommended full capitalization.

E. G. Dempster of Ada spoke on the growing pains of a company emerging from the farmers' exchange status and told of the help that could be obtained from the state commission.

During the address of State Highway Director L. A. Boughlay it was remarked that road widths now are about half of what may be expected 10 years hence. In commenting upon this address, President MacKinnon of the national association told of the trouble that would be caused by thoughtless planting of trees along highways.

F. H. Gardinier of Oberlin addressed the convention on "How Proper Accounting Proves Values that Otherwise Would Be Lost," and advised more attention be given to the I. C. C. system. He cited illustrative cases of proper and improper accounting.

Stopping the Leaks

"Leaks the Wide Awake Company Can Stop" were detailed by C. W. Kugelman of Portsmouth, who referred to thrift opportunities in reclamation of used materials, buying, plant construction and maintenance.

Problems concerning the small exchanges were analyzed by C. L. Jones, Athens, in an address: "Making Money with the Small Exchange," and by W. C. McSherry of Oxford, who gave a forceful affirmative to the question which titled his talk, "Is Good Equipment Most Necessary with the Small and Medium Sized Exchange?" Mr. Jones emphasized efficient help, maintenance of good service, and publicity as the big factors in profitable operation of small exchanges. Mr. McSherry told how vital it was to get the interested co-operation of stock-holders in putting a plant in good condition.

Companies that make well founded plans for the future will be pleasantly surprised by the profit of this foresight, declared Ward H. Snook of Columbus, who spoke on "The Economic Side of the Rate Question." He gave an interest—and though-provoking address on the changing standard of values and outlined the methods of looking ahead in plant extension.

Operators' Conference

A well attended operators' conference had as two of its headliners, Harry Eldridge of the Illinois Bell, Miss Lillian Vavasour, traveling chief operator of the Up-State association of New York, and R. F. Pagels of Warren. Miss Vavasour spoke of the advantages of the conferences and presided over the sessions. Mr. Eldridge made an address on "Morale and Public Relations." Mr. Pagel's paper concerned the increase in revenues that could be effected through efficient operating methods.

"Qualifications of an Operator" were detailed by Miss Trevell Jones of Lima. "The Work of an Operator in a Larger Exchange" was the subject ably handled by Miss D. I. Ryland of Ashland. Mrs. Ruth Clark of Shelby told of "The Operator's Job and Her Problems." What sport writers call "skull drill" was the subject of Miss Marie Thomas' remarks on the "Intelligent Application Essential to Operating Success."

They Kid Kipp

A laughable performance of presenting the raspberry to President Bradley of the Independent Pioneers, and to Conrad Kipp during his initiation to that ancient and honorable organization, featured the big banquet. The Pioneers staged one of their liveliest events, with President Bradley and Secretary-Treasurer Johnston in charge.

Marshaling the Telephone Forces

In the simple act of lifting the telephone receiver from its hook every subscriber becomes the marshal of an army. At his service, as he needs them, a quarter of a million men and women are organized in the Bell System. One skilled corps of the telephone army moves to place him in talking connection with his neighbor in the next block, in the next state or across the continent. Another highly trained corps is on duty to keep the wires in condition to vibrate with his words. Still others are developing better apparatus and methods, manufacturing and adding new equipment, and installing new telephones to increase the subscriber's realm of command.

The terrain of the telephone army is the whole United States, dotted with 14,000,000 instruments, all within range of the subscriber's telephone voice. Even in the remote places this army provides equipment and supplies. Its methods of operation are constantly being improved, that each user may talk to his friends with increased efficiency. Millions of money are spent in its permanent works. Yet its costs of operation are studiously held to the minimum, that the subscriber may continue to receive the cheapest as well as the best telephone service in the world.

The permanent objective of the Bell System army is to meet the telephone needs of the nation—a hopeless task were not its command unified, its equipment adequately maintained and its personnel trained in the latest developments of telephone art.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
BELL SYSTEM
One Policy, One System, Universal Service

Practical Plant Problems

Chapter XVI—Financing Plans (Continued)

By Charles W. McKay, Associate Editor

The old saying, "In the spring a young man's thoughts turn to" (you know the rest) might well be changed to "In the spring the telephone man's thoughts turn to Reconstruction Programs"—at least in so far as the operating executive is concerned.

Especially in our Northern and Mid-Western climes, telephone properties suffer appreciably from the ravages of winter storms and, as a rule, we who are interested in the telephone industry are inclined toward retrospection during the late winter and early spring months. The practical telephone man—still mindful of the damage wrought by the winter's sleet, snow and wind storms—is apt to make elaborate plans, at this time of the year, for replacing defective poles; substituting aerial cable for heavy open wire leads—and stabilizing his outside plant in various other ways. However, human nature is just about the same in the telephone field as in any other line of business of industrial endeavor. The preventable catastrophies, which cause so much worry for the time being, usually inspire elaborate protective plans—but too often these plans are forgotten, or postponed, as the memory of past discomforts slips further and further into the background. This is especially true in the telephone field. Many an elaborate reconstruction program—which owed its inception to the days and nights of worry resultant from interrupted service (directly traceable to the effect of winter storms upon defective outside plant)—has been entirely forgotten, or at least postponed, as the weather conditions become more and more settled during the spring and summer months.

The past winter, however, has been especially severe throughout practically the whole United States—and the writer believes that the reader will not take it amiss if he (the writer) stresses the importance of giving serious thought to plant rehabilitation programs. The advantages of so strengthening the "weak spots" in the outside plant as to obviate the possibility of serious "trouble" next winter, should be obvious, both from an economic standpoint and from the standpoint of maintaining the good will of telephone subscribers.

To diverge for a moment, and to call attention to a specific instance where a telephone company immediately profited by an unfortunate experience—the writer will cite a case which came to his attention some fifteen years ago. An appreciable portion of the rural plant of one of the large eastern companies had long been in a precarious condition. The property in question was located in the midst of the "sleet belt"—but it so happened that no serious storms occurred during a period of some five or six years. Minor repairs and maintenance expenditures, therefore, sufficed to keep the plant in reasonably good working condition—until suddenly and without warning (such catastophies usually do come without warning) an unusually severe sleet storm swept the territory in which the plant under discussion was located. The weight of the sleet and ice on the heavy open wireleads proved too much for the none too stable pole lines. The result:—miles of pole lines were laid flat—completely wrecking the outside plant and cutting thousands of subscribers out of service. Every available man who could climb a pole, or handle wire, was pressed into the severest kind of active service on what practically amounted to a twenty-four-hour schedule. Furthermore, men who were entirely inexperienced with respect to outside plant work (draftsmen, clerks, etc.) were drafted into service as helpers and "ground-hogs."

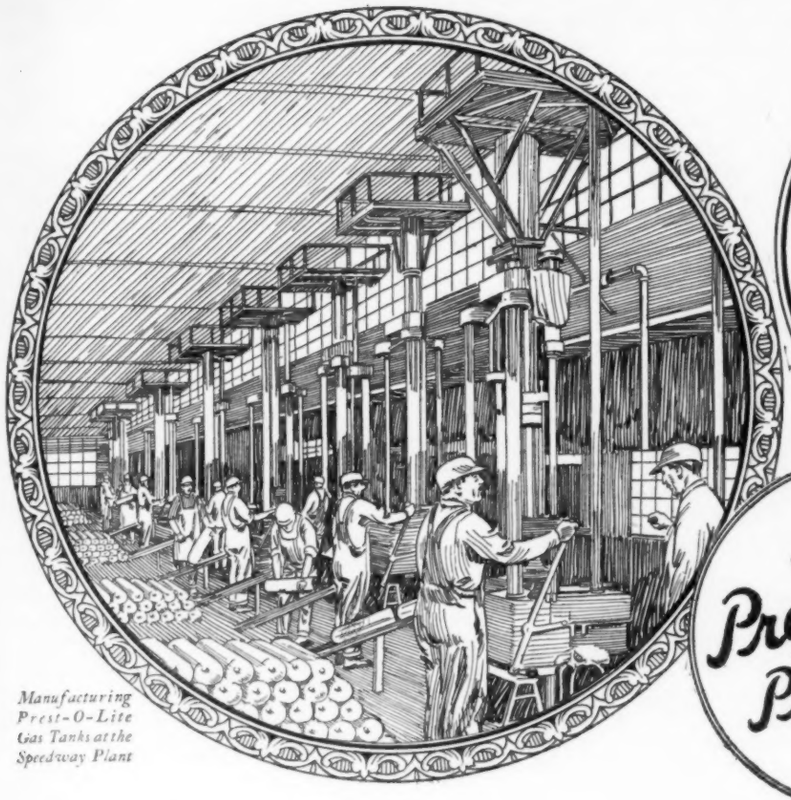
The expense involved in restoring, even a semblance of, service was enormous. Furthermore, practically all of this expense was for work of a temporary nature (the placing of "safety" cables on stubs of poles; along fence lines, etc.)—hence it eventually amounted to an entire loss, insofar as the company's capital accounts were concerned. One of the worst features of the whole affair, however, was that many subscribers were entirely without service for a period of four or five weeks—and the company, quite naturally, suffered from much adverse criticism.

Just as soon as the weather conditions permitted, a large force of engineers was thrown into the field and comprehensive plans were made for a new, permanent outside plant—to replace the plant destroyed by the sleet storm. Needless to say, the plans for the new plant contemplated construction sufficiently sturdy to withstand even the most severe winter weather conditions.

The plans of the engineers were rapidly translated into working specifications and the purchasing department was kept busy placing rush orders for the needed materials. As soon as the construction materials arrived, the entire construction force of the company was again "sent to the front" and in a relatively short time a fine new serviceable plant had been constructed—a plant of which the company had reason to be proud.

In connection with the foregoing, it is interesting to note that this plant is still in "top-notch" condition (replacements and extensions being made at necessary intervals) and that a careful review of the company's records for the period which has elapsed since the "big storm" (as it is still locally referred to) discloses the fact that the subscribers' service record has been well-nigh perfect.

If you, as the operating executive of a telephone company, are confronted with a reconstruction problem—a problem brought home to you by unfortunate experiences during the past winter—you will find that the task of rehabilitating your plant is neither difficult nor expensive (relatively speaking) if you will attack the problem now—or as soon as weather conditions permit—and prosecute the construction program, by easy stages, during the coming spring and summer months. "Weak" poles should be replaced or properly reinforced; heavy open wire leads should be replaced by aerial cable; in some cases, underground construction will doubtless be necessary to permit the removal of pole lines now rendered dangerous through the excessive weights imposed by heavy aerial cables, and, last but by no means least, the drop wire plant should be given especial attention—with a view to replacing antiquated single wire drops (and old duplex drops) with the modern type of No. 17 gauge, copper-clad steel twisted pair drops, or equivalent. Also, in connection with



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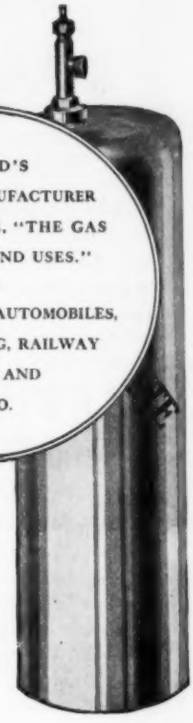

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the drop wire plant especial attention should be given to the stability of the house and pole attachments—even in cases where the drop wire, itself, is known to be of modern type and in good condition.

In connection with this "general overhauling," or "spring-cleaning," of the outside plant—each plant manager is doubtless most familiar with the "weak spots" in his own plant, and, therefore, is in a better position than anyone else could possibly be—to know where to start, and how to prosecute the reconstruction program. It is thought, however, that none of our readers will take it amiss if the writer offers a few practical suggestions (gleaned from the combined past experience of a number of good plant men, who have previously been confronted with similar reconstruction problems), and this, by your leave, the writer will attempt to do in the April installment of this series of articles.

The Bell Co.'s Annual Report

A very prosperous year's business of the Bell telephone system is disclosed in the annual report of the directors to the stockholders of the American Telephone and Telegraph Co. During the year, the parent company earned $11.35 per share of its outstanding capital stock as against $11.14 for 1922. The earnings per share of the past year exceed those of all other years since 1900 with the exception of 1907, 1908 and 1920.

In discussing conditions, President Thayer draws attention to the establishment of new standards of living and new standards of wages since the war. The effect is a greater cost of plant and a greater cost of service, and along with these greater costs a greater demand for service. The indications are that the demand will increase rather than abate.

Holdings of the A. T. & T.

For the benefit of new stockholders, the place of the company in the Bell system is outlined. The company is the owner of the long distance lines and of all the common stock of fourteen companies, a majority holder in nine companies, and a minority stockholder in two companies—the Southern New England Telephone Co. and the Cincinnati and Suburban Bell Telephone Co. It holds over 98 percent of the common stock of the Western Electric Co.; it is a minority stockholder in the Bell Telephone Co. of Canada and owns 50 per cent of the stock in the company which owns and operates the cables between Florida and Cuba. It is the headquarters organization of the Bell system, and the contract relations between the various companies of the system and the parent company are discussed briefly.

Concerning Its Finances

In the financial section of the report, is given a statement of the financial operations of the company for the year. In March, the authorized capital stock was increased from $750,000,000 to $1,000,000,000. This increase was made to provide for commitments under the employee's stock purchase plan, for the conversion of convertible bonds and for future financing.

November 1 the company sold $100,000,000 of twenty year sinking fund 5½ per cent debenture bonds. The proceeds of the sale of these bonds provided for the retirement of $40,000,000 in short term notes and furnished funds for additions and betterments. February 1, 1924, the funded debt aggregated approximately 28 per cent of the total outstanding capital obligations.

Has Over Two Billions Invested

December 31, 1923, the book cost of the net assets used in the business and devoted to earning interest and dividends amounted to approximately $2,287,000,000, or more than 139 per cent of the aggregate amount of securities outstanding. This is the result of retaining in the business, each year, a portion of the earnings which, together with the sale of securities at prices in excess of par, have created a surplus. The depreciation accounting practice and the policy of the company as given during the hearings of the Interstate Commerce Commission also are discussed.

The Bell Telephone Securities Co. has been active in disseminating information about Bell system securities and has worked out a plan so that small investors may purchase stock through application to company employees. In the matters of rate regulation, the work of bringing up rate levels to the point where each state would be self-supporting has progressed during the past year. There has been some litigation in which, in general, the companies have been successful. The position of the company in the matter of rate regulation is restated and it is made clear that litigation in certain cases does not, in any way, change the opinion of the company in the matter of regulation by commission.

The Company's Radio Activities

In the matter of radio telephony, reference is made to the replacing of the Catalina Island radio circuit by the installation of submarine cables. This change further emphasizes the conclusion that the practical field for radio telephony lies in those situations where it is impracticable to employ wire. In the radio broadcasting field, the Western Electric Co. has sold about 40 broadcasting station equipments and much progress has been made in the provision of facilities for connecting broadcasting stations to long distance lines. (The daily newspapers as we go to press carry stories about the Bell taking legal steps against those concerns which it claims are infringing its patent rights through their broadcasting activities.)

New Work Planned and in Process

In the development and research divisions, work has been continued with increasing activity. Designs of apparatus have been improved and new developments carried forward. Among newer projects is the study of transoceanic telephony which is still in the experimental stage.

During the year, 2,160,000 stations were installed and 1,389,000 were removed, leaving a net gain for the Bell system. A new trans-continental route was established in 1923 through Pueblo, El Paso and Los Angeles. The toll cable extensions between New York and Chicago were pushed forward and it is expected that the cable will be completed to Chicago in two years.

The net growth in stations during the year for the Bell system was 891,342 which includes those taken over from the Citizens Telephone Co., of Grand Rapids, Mich., and the Kinloch System in Saint Louis.

One Phone for Every Seven People

There is now one telephone station for each seven persons of the total population of the United States. The average daily number of local connections last year was 41,109,000 and of toll connections, 1,683,000. Exchange wire at the end of the year was 29,954,586 miles, and toll wire, 4,569,256 miles.

Net plant additions for the year were $249,728,023, this being the largest single year's growth in the Bell system. The number of employees at the end of the year was 271,987. Gross operating revenue for the entire system for the year was $601,589,788 and operating expenses $429,076,059. After deductions, the net income was $99,624,472. We note also that $72,428,617 was paid in dividends and $27,195,855 was left to surplus. The combined surplus and reserves of the Bell system, all intangibles excluded, amounted to $621,853,000 on Dec. 31, 1923.

"J
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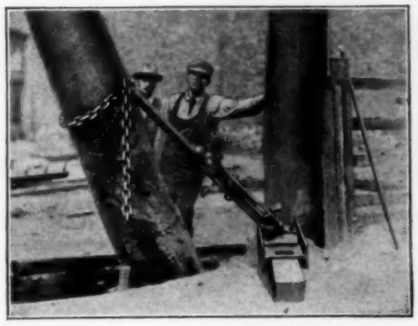

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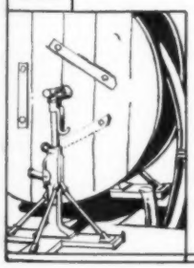

FWD Earth-Boring Machine

Hole Boring and Pole Setting Equipment on Truck

The construction of pole lines for a telephone system embodies a variety of work—close operation in city streets and alleys where adjacent buildings make hand labor slow and difficult, and again on long stretches of country roadside requiring the transportation and maintenance of big gangs of men over long distances through the country. Because men dislike this sort of labor and because speed is the great essential in repair and replacement work, it is often impossible to get the necessary labor finished at the time required.

Such is the case also with the telegraph lines. Across great stretches of country, under every possible topographic and climatic condition telegraph lines are installed and maintained. Through swamps and over mountains, into all kinds of soil are poles set. When sleet, storms, forest fires or snow slides destroy the lines and break the poles it is vital that they be replaecd without delay. To do this with the old methods is often impossible, especially in frozen ground or under water or snow.

These facts are presented by the Four Wheel Drive Auto Co., of Clintonville, Wis., in telling of the adaption of the International Earth Boring Machine to the FWD truck. The earth boring device has been redesigned and made a standard unit with FWD. Of this application the truck company says:

"The FWD Earth Boring Machine digs the holes and sets the poles in them as well. The special advantage of the FWD Earth Boring Machine combination is the equal distribution of load and power to the four wheels of the truck. This principle of power transmission allows for the great amount of traction that is necessary to negotiate the bad roads, ditches and fields where power, telephone and telegraph lines are constructed. The short turning radius of the truck (25 ft. 3 in.) permits the machine to go in and out of the tight places experienced in city

work. Two or three men with this earth boring machine will do more work in a day—dig more holes and set more poles—than sixty men can do by hand. In addition to this great saving in wages is the fact that there never is any difficulty in "getting the men," as there is when attempting to assemble a gang of day laborers. Although pole setting is semi-skilled work, the FWD Earth Boring Machine digs the hole in any kind of soil except solid rock; raises the pole, drops it into place and moves on to the next location in less time than a hole two feet deep can be dug by hand."

New Syntron Type F Hammer Weighs Only 9 Lbs.

A new and lighter model of the Syntron Electric Hammer which the manufacturers have called the "Type F," recently has appeared on the market. It is similar to the two types already in extensive use by telephone men, manufacturers, contractors and central stations, but weighs only nine pounds and is especially adaptable for some of the lighter forms of work such as drilling holes up to one-half inch diameter; light chipping, hammering, and vibrating.

The principle of the Syntron Hammer is revolutionary in so far that it has only one moving part, a reciprocating piston which moves in syncronism with the alternations of the electric current. Hence, on 60 cycle current, it makes 3600 strokes against the head of the tool bit in a minute. For direct current, a small rotary converter is furnished by the manufacturer at a small additional cost.

When the first Syntron Hammers appeared on the market a little over a year ago, they met with general acceptance. Types A and B, weigh 17 and 26 pounds respectively, and are capable of drilling one inch and one-half inch holes in hard concrete in one minute. The outfit is entirely portable, easily carried from place to place and can be attached to any electric light socket. The absence of motors, compressors, tanks, gears, and other cumbersome equipment makes it convenient wherever there is any amount of drilling, chipping, or hammering to be done. Letters from various users tell how efficiently the tool works, how it has saved its cost many times over by speeding up operations, and about its ready accessability on all kinds of jobs. Either one of the three types will consume no more current than the ordinary domestic electric flat iron, or less than ½ K. W.

Automatic Telephones for Shanghai

Seven hundred automatic telephones have arrived in Shanghai and will be put in operation for experimental purposes by the Shanghai Mutual Telephone Co. in March. The telephones were supplied by L. M. Ericsson & Co., Stockholm. It is not known, yet, whether climatic conditions in Shanghai favor automatic telephones. Another uncertain factor is whether the public will pay the increased charges for such a service. If the experiment is successful, there may be a general adoption of the automatic system. This could not be consummated for at least three years owing to difficulties in delivery and installation.

Let Contracts for New Western Electric Plant

New York, N. Y.—Contracts aggregating $195,000 for materials and their installation at the several units of the Western Electric telephone switchboard and cable works now under construction on the company's sixty acre tract at Kearny, New Jersey, have been let. The cable buildings, which are a part of the works where ultimately 30-000 men and women may be employed, will be completed and put into operation this fall.

Bell's Automotive Needs Are in Big Figures

New York, N. Y.—At the present time the motor vehicle fleet of the Bell System consists of more than 8,000 units. Of every 1,500 cars in use in the United States one is in the exclusive service of the Bell System. All but a very small percentage of the cars carry telephone tools and materials in

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specially adapted bodies, and to an increasing extent the units are supplied with various types of labor saving equipment.

A majority of the cars have load-carrying capacities of less than 1,000 pounds each, but there are several thousand trucks capable of carrying net loads of from 2,000 to 10,000 pounds and a few tractor-trailers with load-carrying capacities as great as 30,000 pounds each.

To operate this large group of motor vehicles requires enormous quantities of supplies. To transport the gasoline used annually would require about twelve trainloads of 100 tank cars each and a 50-tank car train of lubricating oil.

If the tire purchases were evenly distributed throughout the year, a new tire costing anywhere from $10 to $160 would be purchased every three minutes. Fortunately, the $10 tires predominate. In order to replace worn-out equipment, it is necessary to buy at the rate of eight new trucks or passenger cars every working day, not to mention the extra units which must be added to care for the growth of the fleet.

Harper Telephone Co., Harper, Tex., has been incorporated by R. C. Crockett and others.

"Reel Trailer" Appears

Reel Carrier and Pole Dolly Combination Gets National Endorsement

Los Angeles, Cal.—The Utility Trailer Mfg. Co. of this city, which has developed a trailer manufacturing enterprise into a prominent Pacific Coast institution has made a successful entry into the telephone field.

More than a year ago the company worked out a trailer for telephone company use, which combines a reel carrier and pole dolly. A two-months test of the equipment was conducted by the Pacific Telephone and Telegraph Co. with results so satisfactory that the trailer was made standard by the Pacific Bell organization. News of the Pacific Coast performance spread so rapidly that the Utility Trailer soon gained a big market among Bell and Independent companies generally.

Utility Trailer for Telephone Company Use

Decay of Poles and Its Cause

Decay of Pole Timber Is Affected Materially by Conditions Surrounding Its Production, Storage and Use. Some Suggestions for the Prevention of Waste Due to Unnecessary Decay

By C. J. HUMPHREY*

(Pathologist, Bureau of Plant Industry, U. S. Department of Agriculture, Madison Wis.)

Any timber placed in contact with the ground will decay, but at different rates, according to the species of wood, the character of the soil, and the climatic conditions of the region where the different material is used. The actual life of poles can only be determined by service tests in the regions for which the data are desired. These data have been secured to a limited degree but there remain many gaps where we can only estimate the probable service of a given species. For instance, in a publication from the Forest Products Laboratory summarizing service data on poles[1] untreated chestnut is reported in service between Gowanda, New York, and Warren, Pennsylvania, for 14 years with only 2.5 per cent renewals for seasoned poles and none for green poles. During the same period 87 per cent of seasoned poles and 58 per cent of green poles were removed from a line between Savannah and Arden, Georgia. In a line between Omaha, Nebraska and Denver, Colorado, 37 per cent of seasoned chestnut poles were removed on account of decay during a period of ten years. Southern white cedar in the Georgia line required 98 per cent renewal of seasoned poles and 94 per cent of green poles in fourteen years. Northern white cedar required 24 per cent removals in ten years in the Omaha-Denver line. Western red cedar in the vicinity of Los Angeles, California, required 39 per cent renewals in 11 years, while in the vicinity of Fresno, California, the life of western yellow pine was six years.

Although these data are meager they give us some idea of the resistance of the various woods to decay. Relative durability of different woods, however, is better represented in percentage of life of some highly durable species. As a standard for this purpose White[2] has taken white oak, assigning to it the arbitrary value of 100 per cent. While this method of presentation does not correct for the effects of soil and climate, and the presence or absence of certain of the more destructive fungi, it does appear to come a little closer to our objective and furnish a basis for further theoretical deductions. White gives the following relative scale of durability for the species under discussion:

White oak standard.....	100
Northern white cedar....	125-175
Western red cedar.....	125-175
Bald cypress	125-175
Chestnut	100-120
Southern white cedar.....	80-100
Longleaf pine	75-100

If the same species of fungi attacked all the different woods and these same fungi were present in all the soils of the different regions, the mathematical calculation of durability would be quite feasible. Since this is not the case, however, we must use such makeshifts as we have, with the full acknowledgment of their faultiness.

Decay is the factor of greatest importance in the deterioration of poles. The service which a pole gives is to a large extent contingent upon its size and the loads which it must carry, since these determine how far rot can progress before failure occurs. Much has been written about decay processes, and it is fully recognized that decay is due almost exclusively to the growth of wood-destroying fungi within the timber. Molds and bacteria play little part in the primary disintegration of wood, but they may come in as secondary organisms to act on the partially decomposed remains left by the wood-destroyers. Molds may cause a considerable loss in weight when they act upon sound wood, but this loss is apparently due to the utilization of easily digested substances, like starches, sugars, etc., contained in the wood rather than to an actual attack upon the cellulose and lignin, which are the principal strength giving substances.

Fungi the Cause of Decay

The fungi which destroy wood are forms of plant life which, though simple in structure, can be compared with ordinary green plants. In the development of a wood-destroying fungus we recognize three distinct phases in the life cycle: (1) The fruit-bodies, which may take the form of conchs or brackets, mushrooms, or simple surface incrustations of fleshy, fibrous or leathery nature; (2) spores which are produced on the fruit-bodies and which may be compared to seeds, since they blow about in the air and germinate on moist wood to produce a new fungus plant; (3) mycelium, which arises directly from the germinating spores and consists of long branched cotton-like threads which ramify through the woody tissues and disintegrate them by the action of ferments which they produce. These threads constitute the absorbing system of the fungus and in this respect are comparable to roots. When we protect wood against decay by artificial means we prevent the development of this mycelium within the wood, either by poisoning its food supply by means of preservatives or otherwise rendering conditions unsuitable for its growth.

Four Conditions Affecting Decay

The fundamental requirements for fungus growth and consequent decay may be summarized under four heads:

Suitable Food Supply.—The chemical composition of the wood must be such that the ferments produced by the fungus can attack it. Differences in chemical constitution, and to a certain extent physical structure, determine durability, other conditions being favorable. The principal species of wood used for poles we have seen are highly durable, and this durability is largely due to chemical substances in the wood which retard the development of the mycelium. The cedars and cypress contain essential oils which are apparently toxic to the fungus; chestnut contains tannin compounds which likewise are not readily utilized by the organisms for food; the resinous pines contain varying percentages of resin, of which the resin constituents act as waterproofing agents and the terpenes (turpentines) are more or less poisonous. Other woods lacking such inhibiting chemicals are highly perishable. The sapwood of nearly every wood which has so far been tested for durability falls in this perishable class.

Moisture.—Of the physiological factors which influence the growth of fungi

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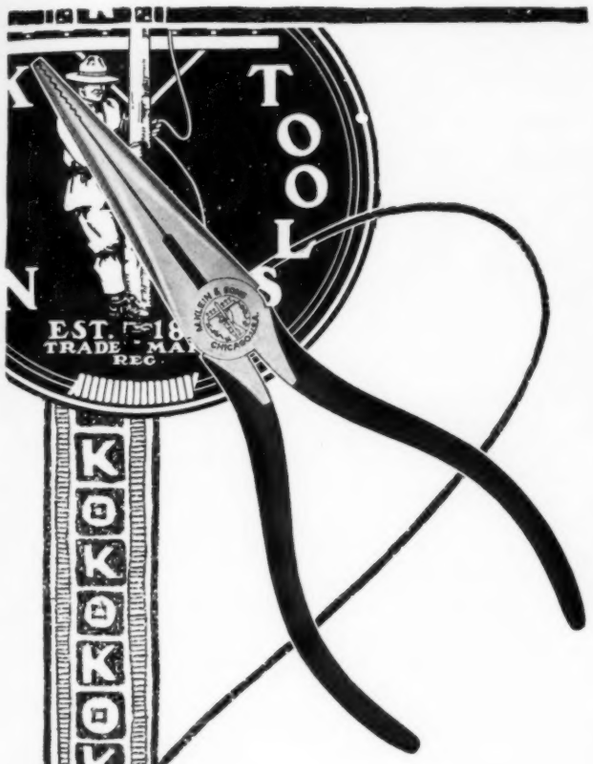
*Extract from report of the Special Committee on Wood Preservation of the American Electric Railway Engineering Association.

[1]Hicks, P. R., Service tests of treated and untreated poles (1921 Convention Report of Overhead Systems Committee, Technical National Section, Nat. Elec. Light Assoc., 16 pp., ill. 1921).

[2]White, D. G., Relative durability of untreated native woods. (South. Lumberman, Sept. 2, 1922.)



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even in non-durable woods the moisture content of the wood is by far the most important and the one which we must control if we are to prevent decay. There is a definite moisture range in wood which produces the most rapid decay. We know that wood kept in a thoroughly dry condition will not decay, due to lack of moisture; going to the other extreme we recognize that wood saturated with water so as to exclude all air will likewise remain sound. Between these ranges then we must search for the favorable moisture content. Experience leads us to believe that at the fiber saturation point, where the water is all contained in the cell walls, and amounts to 20-30 per cent of the dry weight of the wood, decay is relatively slow, while a little free water in the cell cavities hastens it markedly. The whole question needs thorough investigation, however, before we can say just where the most favorable point lies. In all probability it will vary for different fungi, since we know that a fungus like Lentinus lepideus readily decays timber of a high moisture content, while Lenzites sepiaria is frequently found on comparatively dry wood exposed to the hot sun. In this respect the so-called dry-rot fungi, such as Merulius lachrymans and relatives and Poria incrassata, show an apparent ability to decay timber in a dry condition, while in reality they carry moisture to it by means of porous conducting strands. In fact our so-called dry-rot fungi are known to originate under quite moist conditions.

We often hear it stated that alternating wet and dry conditions are essential to rapid decay. This is readily explained on the basis that at some point between the wet and dry conditions the moisture is favorable for decay. If the timber were maintained at this favorable point we would find that it would decay even more rapidly, since the total amount of rot depends upon the length of the favorable interval.

As further indicating the importance of moisture we have but to observe the way in which the staves of large water tanks decay. These usually rot in a zone about half-way through the stave. The inner face of the stave being constantly saturated is preserved, while the outer face being exposed to the outside air is maintained in too dry a condition for decay. The middle zone, representing average moisture, soon disintegrates. A like phenomenon occurs with poles, for it is not uncommon to observe rot extending up the pole above the ground line, leaving a thin shell of the outer sapwood intact. In a moist climate such shells may be stripped away from 20 to 30-foot poles of untreated pine entirely to the top.

Temperature. — The heat requirements of wood-destroying fungi vary to a considerable extent. Most of them, however, grow rapidly between 75 deg. and 85 deg. Fahr. The different species of Lenzites which rot poles so frequently grow well at a point considerably above this, the optimum frequently lying around 90 deg.-95 deg. Fahr., the fungus ceasing growth only around 110 deg.-115 deg. Fahr. None of the fungi concerned in the decay of wood are, as far as we know, killed by the coldest weather. Certain ones have withstood the temperature of liquid air (—307 deg. Fahr.). Low temperatures, while they do not kill the fungi, render them less active or inactive so that around the freezing point decay will be very slow in most cases, but readily accelerates on the resumption of more favorable conditions. This reaction to temperature explains to a certain extent the greater aggregate loss from decay in the warmer regions of the country where the moisture is sufficient for decay to progress.

Air Supply.—All wood-rotting fungi require air in their growth. True, it is only required in comparatively small amount, but there must be some air within the wood before it will decay, otherwise wood saturated with water would rot. We hear much about poor ventilation causing decay, but this is not due to cutting down the air supply. It is due to the stagnation which permits the humidity to rise to a point where it is favorable to the germination and growth of the fungi. A free circulation of air is always beneficial for this reason.

Combating Decay in the Untreated Poles

In combating decay in untreated poles, then, we must, wherever possible, modify the conditions above outlined so as to render them as unfavorable to fungous growth as we can. While we cannot modify the weather and soil conditions, we can at least study their effect on decay in different parts of the country and thus eventually gain further knowledge which will be of value in predicting how a given wood will behave under varying conditions. This in itself will give us the clue as to whether or not preservative treatments are an economy and the kind of treatment which will be effective.

The most immediate and direct results, however, will be secured in the improvement of storage conditions for poles during the seasoning period. It must first be recognized that poles are a highly perishable commodity, and the more unfavorable the climatic conditions the more attention must be given to their proper storage. All poles except those sawn from large trees, such as redwood, have a mantle of perishable sapwood which is very susceptible to infection and decay.

Decay in poles must be considered from two angles: (1) Heart or butt rots which have developed in the standing living tree; (2) rots which enter after the poles are cut.

Heart or Butt Rots.—These rots are due to a number of forest fungi which invade the trunk of the living tree, gaining entrance usually through some wood, such as dead branch stubs, mechanical abrasions, fire or lightning scars, frost cracks, etc., or through the roots. They are comparatively slow in their development. Grading and inspection rules cover this class of rots quite carefully, although the fact that certain of them will continue to develop after the trees are cut is not given sufficient consideration. Fortunately for the industry, however, the heart rots of the cedars and cypress are not considered dangerous in this respect, although our information on the subject is quite meager. It is when we get into the class of less durable woods, such as certain of the pines, hemlocks, spruce, etc., that major difficulties may be experienced. The red-heart or ring scale of various conifers is one of the rots which we are investigating at the present time and which is in some dispute. This rot is known to continue its development to a certain extent when placed in contact with moist soil, but in all probability would not prove serious in the drier regions of the country.

Rots Which Enter After Poles Are Cut.—While these rots cannot be fully controlled during seasoning, they can be greatly reduced in extent by careful handling of the stock. They come in either as a result of the timber lying for a short time in contact with the ground or from spores blowing about the air, some of which settle on the poles, germinate, and penetrate the sapwood.

Suggestions for Preventing Rot

Knowing these facts, then, how do we combat such rots? We may summarize the procedure under the following heads:

1. Cut poles during the winter months where feasible, since fungi are less active at this season. The poles will likewise season more slowly and thus prevent excessive checking, which is recognized as one of the main points of entrance for wood-destroying fungi. By the time the most active season for fungous development arrives the poles will thus be partially seasoned, the outer surface at least being considerably dried.

2. As soon as the poles are felled and peeled see that they are stored in an open, well-ventilated place on founda-

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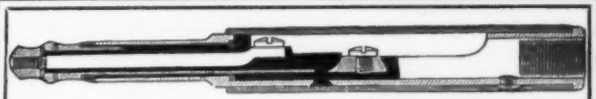

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tions well off the ground. The piles should be separated so as to allow as free air circulation as possible. Why do we recommend this practice? Simply because if placed directly on the ground the fungi which are very abundant in woods or humus soil will grow directly into the wood from contact. Under such conditions the lower layers of poles will not alone be prevented from drying out, but will often absorb additional moisture from the soil. If the material is stored in solid masses very little opportunity is offered for the necessary drying, which is so important during the early storage period. It should always be kept in mind that in moist wooded regions there is always a great abundance of wood-rotting fungi to produce and spread spores to the cut timber.

3. Ship timber to the main seasoning yard as soon as possible, for poles can be cared for to better advantage in a suitably arranged permanent yard than in the woods.

4. Maintain the storage yard in a first-class sanitary condition by removal of all infected and rotting debris which can serve to infect the stock. Provide for good surface drainage, keep down grass and weeds which impede air circulation, and stack the poles on foundations well off the ground and amply ventilated beneath.

5. If poles could be protected against the weather so as to prevent both checking and the opening and closing of checks by alternate wetting and drying after seasoning is partially accomplished, decay would be largely eliminated. In certain cases this may prove wholly feasible for the larger and more valuable stock, or where the storage period must necessarily be prolonged.

6. Never apply a coating of oil paint to poles unless they are thoroughly dry. This will prove universally disastrous by preventing the complete seasoning of the poles. Several cases of severe decay have come to the writer's attention as a result of such practices. The question is often raised whether a brush treatment with some good preservative will not protect poles from decay during the seasoning period. This phase of the problem has never been thoroughly investigated in the different regions. From our experiments in dipping green lumber, however, we would anticipate only partial control by this means. The principal reasons for failure are the insufficient penetration of the preservative and the later opening of season checks through the treated zone so that fungi can readily enter. If poles were protected against the weather and seasoned slowly so as to avoid this difficulty the method would be much more efficacious.

We cannot emphasize too much the great need for careful handling of poles, rapid turn-over, and the application of the final preservative treatment as soon as the poles are sufficiently dry for this purpose.

It is not the purpose of this paper to deal with the economics of pole line construction. The methods of wood preservation for poles and crossarms have been fairly well worked out by the different consumers. Suffice it to say that the use of coal-tar creosote, or other suitable antiseptics, can be extended to good advantage in many cases to accessory structures such as terminal boxes, etc., which are exposed to the weather. Also the trade should not rely too much on the reputed natural durability of pole timbers, for there is a considerable variation in the amount of non-durable sapwood in some species. Where the proportion is high preservative treatment should be resorted to.

U. S. Independent Association Activities

Chicago, Ill.—In a bulletin sent out to member companies, President F. B. MacKinnon of the United States Independent Telephone Association gives a brief outline of activities of the association since the first of the year and announces some of the future plans. The officers of the association have been busy attending state conventions, Secretary Deering and President MacKinnon dividing the work. Progress is being made in the formulation of long distance operating rules and it is hoped that the rules may be ready for distribution in May. A second edition of "Magneto Service Instructions" has been prepared by Miss Anne Barnes and copies have been mailed to member companies. The association's Washington office has been active in income tax and internal revenue tax matters. Member companies have been advised of proposed changes in internal revenue and income tax law.

A letter announcing a ruling on the collection of internal revenue tax on uncollectible toll messages has been sent out. This ruling is to the effect that the companies are not liable for the collection of tax except under certain conditions. The investigation of financial conditions and accounting practices of member companies is proceeding under the direction of J. C. Paxton, assistant to the President. An executive meeting of class "A" companies will be held in April to discuss accounting practice and other procedure of the companies. This meeting will be attended by executives, accountants and engineers of the class "A" companies.

Chillicothe District Meeting of Illinois Association Has Many Interesting Features

Chillicothe, Ill.—The February district meeting of The Illinois Telephone Association was held here February 13th. The sessions of the executives' conference presided over by A. R. Patterson, Vice President of the Association, and the sessions of the traffic conference were under the direct supervision of Miss Pearl Thompson, Traveling Chief Operator of the Association.

At the executives' conference there were discussions on the relative merits of single and double wrapped paper cable, on the matter of interference of ringing converters with radio receiving sets, and of making collections. A demonstration of standard methods of line work was given under the direction of F. C. Davies, assisted by H. L. Scharf, Thomas Cunningham, and Lloyd Wells, of the Peoria office of the Illinois Bell Telephone Company, which included the bridling at the terminal, the stringing of a span of open wire and one of twisted pair, the placing of a drop, and the inside wiring on the subscriber's premises.

This was followed by a talk by Wm. L. McLaughlin, manager of the Peoples Telephone Co., Chillicothe, on methods used to locate faults in aerial and underground cables. Short and interesting talks were also given by Dr. R. E. Gordon, El Paso, Illinois, President of the Illinois Telephone Association, and by E. D. Glandon, Pittsfield, Illinois, and others.

At the traffic conference and operators' school, morning and afternoon sessions were held at which a splendid program was carried out and the many problems that daily confront the operator were thoroughly discussed to the very great benefit of all present.

Those who could remain for the evening had the pleasure of meeting with the Chillicothe Kiwanis Club at a 6:00 o'clock dinner, at which the program was in charge of Wm. L. McLaughlin. Short talks were given by Dr. R. E. Gordon, President of The Illinois Telephone Association, A. R. Patterson, Vice President, and Miss Pearl Thompson, Traveling Chief Operator.

Attorney L. C. Foss, of Newport, N. Y., has filed for J. T. Wooster and others articles incorporating the Ohio Telephone Co., with $25,000 capital, to operate in Herkimer, Hamilton and Fulton counties.

Inter-County Telephone Co., Englewood, McMinn county, Tenn., has been capitalized at $5,000, with D. D. Edgemon, Lizzie Edgemon, Addie Edgemon, W. W. Elledge and Sallie Smith, incorporators.

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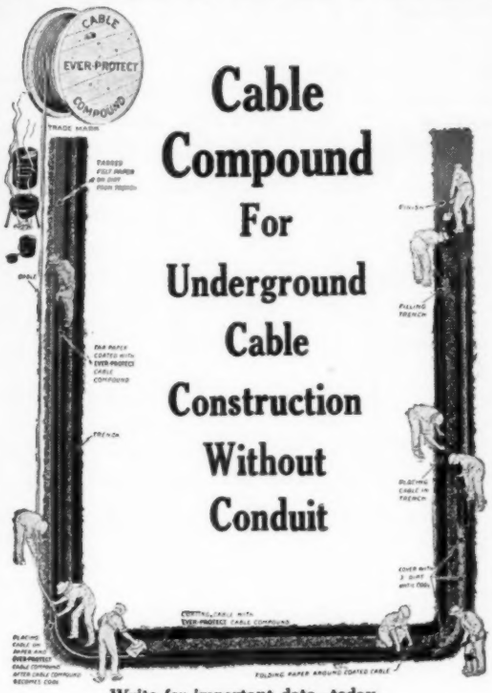

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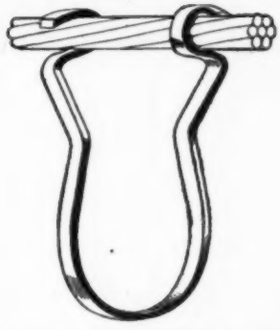

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Bowen Re-elected President of Georgia Association

William R. Bowen, of Fitzgerald, was re-elected president of the Georgia Association of Independent Telephone companies at Atlanta, Feb. 26

One new vice-president was elected —J. Smith Lanier, of West Point. W. R. Hunter and J. M. Dent were re-elected as vice-presidents. J. L. Mathews, of Statesboro, was re-elected secretary and treasurer.

The ten directors were re-elected, along with the following additions: J. W. Southall, of Cairo; B. Y. Chambers, of Moultrie; J. T. King, of Milledgeville; J. I. Stanford, of Mt. Vernon, and Ed. M. McKenzie, of Montezuma.

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Texas Arranges for Its Biggest State Meeting

Waco, Tex.—According to the advance statements on the forthcoming nineteenth annual convention of the Texas Independent Telephone Association, which have been made by L. S. Gardner, secretary of the organization, approximately 400 telephone men will be in attendance. A big exhibition of equipment and supplies is to include practically every prominent Independent manufacturer.

The meeting is to be held at the Texas Hotel, Fort Worth, March 18-21.

New Officers Elected at North Dakota Meeting

H. A. Brown, of Cooperstown, was elected president of the North Dakota Telephone Association at the annual convention held in Valley City, February 19-21. Other officers elected for the ensuing year are: vice-president, A. T. Nicklawsky, of Hillsboro; and secretary-treasurer, F. R. Irons, of Starkweather. Executive committee: M. M. Borman, of Abercrombie; J. H. Smith of Beach; L. D. Richardson of Fargo, and J. O. O'Keefe of Cavalier.